

DRAFT
ENVIRONMENTAL ASSESSMENT
FOR
NAVAL NUCLEAR POWER TRAINING COMMAND FACILITY
PERIMETER FENCE CONSTRUCTION
JOINT BASE CHARLESTON, SOUTH CAROLINA

JULY 2019



This page intentionally left blank.

DRAFT

**DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY
DEPARTMENT OF THE AIR FORCE**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND FINDING OF NO
PRACTICABLE ALTERNATIVE (FONPA) FOR THE NAVY NUCLEAR POWER
TRAINING COMMAND PERIMETER FENCE CONSTRUCTION, JOINT BASE
CHARLESTON, BERKELEY COUNTY, SOUTH CAROLINA**

Pursuant to the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) Parts 1500-1508) implementing the National Environmental Policy Act (NEPA), Department of the Navy (Navy) implementing requirements 32 CFR Part 775, and Department of Air Force (Air Force) implementing requirements 32 CFR Part 989, the Navy as the lead agency with cooperation from the Air Force gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement (EIS) is not required for the Navy Nuclear Power Training Command (NNPTC) Perimeter Fence, Joint Base Charleston Naval Weapons Station (JB CHS-WS), South Carolina.

Purpose and Need: The purpose of the project is to improve the physical security and provide the necessary level of protection for the NNPTC and Naval Health Clinic Charleston (NHCC) facilities at JB CHS-WS. The Proposed Action is needed to prevent unauthorized personnel or vehicular access and to meet current Department of Defense Antiterrorism Force Protection criteria. The lack of adequate security measures could potentially jeopardize the ability of the NNPTC to provide the training environment essential to support its mission.

Proposed Action: The Navy proposes to construct a perimeter security fence/clear zone and associated support structures around the NNPTC and NHCC at JB CHS-WS. The Proposed Action includes construction of a security fence, vehicle and pedestrian access gates, a 12-foot-wide patrol road (suitable for golf carts and utility vehicles), and installation of associated lighting. A 50-foot clear zone would be established and maintained post-construction. Clear zone maintenance activities would include a combination of mowing, trimming, and the use of approved herbicides. Herbicides would be applied annually along the fence line and sections of the clear zone,

DRAFT

supplemented by spot treatment as needed. The proposed project implementation would occur as early as fiscal year 2020.

Alternatives Analyzed: The Navy identified four action alternatives that accommodated the elements presented above for the Proposed Action.

Alternative 1 (*Preferred Alternative*): Alternative 1 would best meet the JB CHS-WS mission and needs presented above. The Preferred Alternative would include the installation of a *Perimeter Security Fence with Elevated Patrol Road and Culverts*. Under Alternative 1, installation of a chain-link perimeter security fence and patrol road would enclose the NNPTC, NHCC, barracks, and associated parking areas. This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 14.90 acres.

Alternative 2: This alternative includes the installation of a *Perimeter Security Fence with Low Water Crossings and No Culverts*. The fence alignment under Alternative 2 would be the same as Alternative 1; however, low water crossings would be used to traverse wetland areas and ditches, the patrol road would not be elevated, and no culverts would be installed. This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 14.90 acres.

Alternative 3: This alternative includes the installation of a *Perimeter Security Fence Without a Continuous Patrol Road*. The fence alignment under Alternative 3 would be the same as Alternative 1; however, the patrol road would not be continuous. In areas without a patrol road, the clear zone would be 20 feet. The wetland areas would not be traversed by a patrol road at the crossings and the fence would need to have increased security features (e.g., higher fence height, double outriggers, and/or a waiver from the Antiterrorism Force Protection clear zone standards). This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 8.74 acres.

Alternative 4: This alternative includes the installation of a *Perimeter Security Fence Without Enclosing the Student Parking*. The fence alignment for Alternative 4 would be the same as Alternative 1 except the student parking area would not be enclosed. This alternative would require an additional access road (0.34 acre) and a minimum of two more pedestrian gates.

DRAFT

This alternative would require additional security measures such as: military personnel in a guard shack to monitor and maintain security of the parking area. This alternative would include 2.56 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 15.37 acres.

No Action Alternative: Under the no action alternative, no security improvements would be constructed or installed. The property would remain unfenced and open to unauthorized access by trespassers. The No Action Alternative is used to analyze the consequences of not undertaking the Proposed Action and provides a benchmark enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives.

Environmental Consequences: The NNPTC Perimeter Fence EA provides analyses of the potential environmental consequences resulting from implementing the Proposed Action and alternatives. Twelve resource categories were thoroughly analyzed to identify potential impacts. According to the analysis in this EA, implementation of the Proposed Action with the prescribed wetland mitigation would have no potential for significant direct, indirect, or cumulative impacts to any environmental resource category or significantly affect conditions at JB CHS-WS. The following is a summary of the EA findings.

Water Resources: Implementation of the Preferred Alternative would require permanent loss of approximately 2.97 acres of wetlands and 161.7 linear feet of streams; however, this loss would be mitigated through the purchase of wetland and stream bank credits (specific wetland credit numbers and wetland mitigation bank location would be finalized once designs are completed during the USACE permitting process). A formal mitigation plan noting mitigation details would also be prepared. Permitting of these actions with the USACE and South Carolina Department of Health and Environmental Control would be completed prior to construction. All required mitigation and impact minimization protocols laid out in the wetland permit process would be implemented by the Navy.

Impacts to groundwater would be minor, and impacts to water quality would be minimized through the use of standard construction best management practices (BMPs) for minimizing soil erosion and any other potential contamination from construction activities. Storm water would be managed through the design and implementation of standard storm water

DRAFT

engineering controls, such as culverts directing flows to detention areas. All required storm water protection measures, BMPs, and minimization efforts would be undertaken to limit impacts from runoff. Approved herbicide application along the fenceline and clear zone would be conducted in accordance with the procedures documented in the base's Integrated Pest Management Plan. The project area is not located within the 100-year floodplain; therefore, there would be no impacts to floodplains. Under the No Action Alternative, there would be no construction; therefore, there would be no impacts to water resources.

Biological Resources: Under the Preferred Alternative, long-term vegetation impacts would occur with the clearing of approximately 9 acres of forested land. However, given the abundance of nearby forest land, the impacts are considered to be insignificant. Herbicide application along the fenceline and clear zone would be conducted in accordance with the procedures documented in the base's Integrated Pest Management Plan. Wildlife and migratory bird species may be temporarily impacted during the clear zone clearing and fence construction phases. Larger species would avoid the construction area. Some small, less mobile species could be impacted. Clearing of forest could impact migratory birds. Construction time limits would be implemented to the maximum extent practicable to avoid impacts to migratory birds and Birds of Conservation Concern. In accordance with the Integrated Natural Resources Management Plan (INRMP) and Migratory Bird Management Plan, the project areas would be managed in a manner that supports migratory bird conservation to the extent possible and consistent with the military mission. As a result, the Preferred Alternative would not result in a significant adverse effect on a population of a migratory bird species.

The Navy prepared a Biological Evaluation to analyze potential impacts to threatened and endangered species as a result of the Proposed Action. The Navy determined that the implementation of the Preferred Alternative may affect but is not likely to adversely affect the Red Cockaded Woodpecker (*Picoides borealis*) and the wood stork (*Mycteria americana*) and would have no effect on the northern long-eared bat (*Myotis septentrionalis*), West Indian manatee (*Trichechus manatus*), frosted flatwoods salamander (*Ambystoma cingulatum*), American chaffseed (*Schwalbea americana*), Canby's dropwort (*Oxypolis canbyi*), and pondberry (*Lindera melissifolia*). The Preferred Alternative would have no effect on critical habitat, as none is located in the project

DRAFT

area. The Navy submitted the Biological Evaluation to the USFWS and initiated informal consultation on May 30, 2019. The USFWS concurred with the Navy's determinations on June 12, 2019. Under the No Action Alternative, there would be no construction; therefore, there would be no impacts to biological resources.

Land Use and Coastal Zone Management: The Preferred Alternative would have minor impacts to lands in the vicinity of JB CHS-WS. The Preferred Alternative is consistent with the JB CHS Installation Development Plan (IDP) and the Goose Creek Comprehensive Plan. The IDP identifies the security fence as a recommended future project. Reduction of open space would have a minor impact on the IDP existing land use map. These impacts would not be significant because the IDP future land use map designated the existing open space land within the NNPTC and NHCC footprints as built-up land uses. Minor, short-term impacts from disturbance due to construction could occur.

Implementation of the Preferred Alternative would be consistent to the maximum extent practicable with the enforceable policies of South Carolina's Coastal Zone Management Plan. The Navy prepared a Coastal Zone Consistency Determination and submitted it to the South Carolina Ocean and Coastal Resource Management (OCRM) office on July 1, 2019. Upon review, OCRM issued its concurrence with the Navy's determination dated _____, 2019. Under the No Action Alternative, there would be no construction; therefore, there would be no change to land use or the coastal zone.

Geology: Under the Preferred Alternative, temporary impacts to soils could occur during construction. Additional impervious surface would increase long-term risk of erosion of soils, but would be minimized through the use of standard erosion and sedimentation control BMPs. Under the No Action Alternative, there would be no construction; therefore, there would be no change to soils.

Cultural Resources: No effects on cultural resources are anticipated. On November 14, 2018, the South Carolina State Historic Preservation Officer (SHPO) concurred with the assessment that no properties listed in or eligible for listing in the National Register of Historic Places would be affected by the Proposed Action. If cultural resources are discovered during construction, the South Carolina SHPO would be consulted. Pursuant to 43 CFR 10, federally recognized Native American Tribes would be consulted if any "cultural items" subject to the

DRAFT

provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) are suspected or identified. Pursuant to NHPA Section 106, the Navy coordinated with the Tribal Historic Preservation Officer of the Catawba Indian Nation. Via letter dated June 21, 2019, the Tribal Historic Preservation Officer of the Catawba Indian Nation stated that it has no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project. Under the No Action Alternative, there would be no construction; therefore, there would be no effect to cultural resources.

Infrastructure: No adverse impacts to infrastructure and utilities would occur with implementation of the Preferred Alternative. During construction, there would be a temporary increase in the number of workers at the installation using utilities. After construction, there would be a slight increase in the need for electricity for lighting. However, LED lights would be used to reduce energy consumption. Under the No Action Alternative, there would be no construction; therefore, there would be no adverse impacts to infrastructure. Under the No Action Alternative, no beneficial impacts to infrastructure would occur from implementing the Antiterrorism Force Protection standards.

Air Quality: The region of influence for air quality is in attainment for all criteria pollutants. Therefore, a general conformity determination is not required. Impacts would be minor and temporary during both the construction phase and the subsequent fenceline and clear zone management phase. No significant impacts would occur to air quality in the region of influence nor would regulatory thresholds be exceeded. Under the No Action Alternative, there would be no construction; therefore, there would be no impacts to air quality.

Noise: The Preferred Alternative would result in temporary, localized increases in noise levels during construction and maintenance. Noise would occur during normal working hours and potential impacts at the closest military residences would be limited to annoyance. Construction noise would add minimally to overall noise levels at noise-sensitive locations. Most of the area immediately adjacent to the proposed fence is either open/wooded area or is used for non-noise-sensitive activities

DRAFT

such as commercial/industrial activities. Therefore, construction noise would have minimal impacts. Under the No Action Alternative, there would be no construction; therefore, there would be no impacts to noise.

Public Health and Safety: The Preferred Alternative is expected to generate increases in construction traffic, emissions, and noise, but these increases would be minor, temporary and localized. The Preferred Alternative includes construction of a fence and clear zone that would improve physical security and Antiterrorism Force Protection, a long-term beneficial impact to public health and safety. Therefore, the Preferred Alternative is not expected to result in significant impacts to public health and safety. Under the No Action Alternative, there would be no fence and clear zone construction; therefore, there would be no change to existing public health and safety and no beneficial impact to existing public health and safety.

Hazardous Materials and Waste: Under the Preferred Alternative, there would be negligible increases to hazardous materials use and generation of hazardous wastes. No impacts would result from special hazards and no impacts would occur to active Environmental Restoration Program sites. Disposal of construction debris and a small temporary increase in solid waste generation resulting from construction workers would be handled pursuant to the applicable federal, state and local laws. There is sufficient capacity at existing landfills in the vicinity of JB CHS-WS to adequately accommodate the quantities estimated for the Preferred Alternative. Under the No Action Alternative, the Navy would not construct the fence; therefore, no changes to hazardous materials, hazardous waste, or solid waste resources would occur with implementation of the No Action Alternative.

Socioeconomics: Under the Preferred Alternative, there would be temporary and minor benefits to employment and earnings associated with construction and one-time injection of funds into the local community. Under the No Action Alternative, there would be no change to current economic conditions.

Environmental Justice and Protection of Children: Pursuant to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, implementation of the Preferred Alternative would not result in disproportionately high and adverse human health or environmental effect on any minority or low-income populations.

DRAFT

Under the No Action Alternative, there would be no change to current environmental justice conditions.

Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, no environmental health and safety risks would be generated that would disproportionately affect children. The Preferred Alternative would generate minor, localized, and temporary increases in construction traffic, emissions, and construction noise. However, through enhanced security, the fence would provide long-term public health and safety benefits to populations of all ages, as opposed to health or safety risks.

Cumulative Impacts: The following resources were evaluated for cumulative effects: water resources, biological resources, land use, geological resources (soils), infrastructure, air quality, noise, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice. Other past, present, and foreseeable actions in the region of influence were analyzed in the EA. The results of the analysis in the EA indicated that there would be the potential for cumulative impacts; however, no significant cumulative effects to resources would be caused by implementation of the Preferred Alternative.

Public Involvement: The NEPA process is designed to involve the public in the federal decision-making process. Formal notification and opportunity for public participation were provided during the preparation of this EA. Coordination and consultation with government agencies and planners was also conducted.

The Navy conducted scoping early in the NEPA process. Letters were mailed to agencies requesting input and comments. A Notice of Availability of the Draft EA in compliance with NEPA and Executive Order 11990, *Protection of Wetlands*, was published in *The Post and Courier* (Charleston County, South Carolina) in July 2019.

The Draft EA and the Draft FONSI/FONPA were made available for public review during a 30-day comment period at the Dorchester Road Regional Library in North Charleston, South Carolina, the Joint Base Charleston - Weapons Station Branch Library in Goose Creek, South Carolina and on the Naval Facilities Engineering

DRAFT

Command Southeast public website. Comments received will be considered in preparing the Final EA and the Final FONSI/FONPA.

Finding of No Significant Impact: Based on the analyses presented in the EA, and coordination with the U.S. Fish and Wildlife Service, the South Carolina Department of Archives and History, the South Carolina Department of Health and Environmental Control, the South Carolina Ocean and Coastal Resource Management (OCRM) office, and the U.S. Army Corps of Engineers, Charleston District, the Navy and Air Force find that implementation of the Proposed Action will not have a significant effect on the quality of the human or natural environment and preparation of an Environmental Impact Statement is not warranted.

Findings of No Practicable Alternative: Executive Order 11990, *Protection of Wetlands* authority incorporated into Navy and Air Force regulations and the written re-delegations accomplished pursuant to the Order, we find that there is no practicable alternative to implementing the Proposed Action within wetlands, and the Proposed Action includes all practicable measures to minimize harm to wetlands environments.

The Perimeter Fence EA prepared by the Navy in cooperation with the Air Force addressing this action is on file and interested parties may obtain a copy by downloading the EA from the project website:

https://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/south-east/about-us/environmental-planning.html.

Date

G.A. MAYES
Rear Admiral, U.S. Navy
Commander, Navy Region Southeast

Date

Randy L. Boswell
Colonel, USAF
Chief, Logistics Operations &
Civil Engineer Division

This page intentionally left blank.

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] parts 1500–1508), and 32 CFR part 989, Environmental Impact Analysis Process (EIAP). The process provides an opportunity for public input on Navy and Air Force decision-making, allows the public to offer inputs on alternative ways for the agency to accomplish what it is proposing, and solicits comments on the agency's analysis of environmental effects. Public commenting allows the action proponent to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

This page intentionally left blank.

Abstract

Designation: Environmental Assessment

Title of Proposed Action: Naval Nuclear Power Training Command Facility Perimeter Fence Construction (Project P-177)

Project Location: Goose Creek, South Carolina

Lead Agency for the EA: Department of the Navy

Cooperating Agency: Department of the Air Force

Affected Region: Berkeley County, South Carolina

Action Proponent: Naval Nuclear Power Training Command

Point of Contact: Jeffery H. Butts, J.D., AICP
Naval Facilities Engineering Command Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508-1278
jeffery.butts@navy.mil

Date: July 2019

The United States Navy, along with the United States Air Force as a cooperating agency, has prepared this Environmental Assessment in accordance with the National Environmental Policy Act (NEPA), and the Council on Environmental Quality, Navy, and Air Force regulations for implementing NEPA. The Navy proposes to construct a perimeter security fence/clear zone and associated support structures around the Naval Nuclear Power Training Command and Naval Health Clinic Charleston at the Naval Weapons Station area of Joint Base Charleston, South Carolina. The Proposed Action includes construction of an 8-foot-tall security fence, vehicle and pedestrian access gates, and a 12-foot-wide patrol road, and installation of associated lighting to meet Antiterrorism Force Protection requirements (Project P-771). A 50-foot clear zone would be maintained with vegetation pruned to 8 inches in height. The proposed project implementation would occur as early as fiscal year 2020. This Environmental Assessment evaluates the potential environmental impacts associated with four action alternatives (Alternative 1, Alternative 2, Alternative 3, and Alternative 4) and the No Action Alternative to the following resource areas: water resources, biological resources, land use, geological resources, cultural resources, infrastructure, air quality, noise, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice.



This page intentionally left blank.

EXECUTIVE SUMMARY

ES.1 Proposed Action

The United States Navy (Navy) proposes to construct a perimeter security fence/clear zone and associated support structures around the Naval Nuclear Power Training Command (NNPTC) and Naval Health Clinic Charleston (NHCC) at the Naval Weapons Station area of Joint Base Charleston, South Carolina. The project area perimeter currently has limited security fencing and, depending on the alternative selected, could include fencing up to 2.80 miles. This is not a proposal for a fence around the overall facility (Joint Base Charleston-Weapons Station [JB CHS-WS]). The Proposed Action includes construction of a security fence, vehicle and pedestrian access gates, and a 12-foot-wide patrol road (suitable for golf carts and gator-type vehicles), and installation of associated lighting. A 50-foot clear zone would be maintained with vegetation pruned to 8 inches in height. The proposed project implementation would occur as early as fiscal year 2020.

ES.2 Purpose of and Need for the Proposed Action

The purpose of the project is to improve the physical security at JB CHS-WS and provide the necessary level of protection for the NNPTC and NHCC facilities.

The Proposed Action is needed to prevent unauthorized personnel or vehicular access and to meet current Department of Defense Antiterrorism Force Protection criteria. The lack of adequate security measures could potentially jeopardize the ability of the NNPTC to provide the training environment essential to support its mission.

The Proposed Action would enable compliance with the following codes and guidance:

- Antiterrorism Force Protection standards
- Department of Defense 5200.08-R, *Physical Security Program*
- Unified Facilities Criteria 4-010-01, DoD Minimum Antiterrorism Standards for Buildings
- Unified Facilities Criteria 4-022-03, *Security Fences and Gates*
- Chief of Naval Operations Instruction 5530.14E, *Navy Physical Security and Law Enforcement Program*
- Navy Tactics, Techniques, and Procedures 3-07.2.3, *Law Enforcement and Physical Security*

ES.3 Alternatives Considered

Alternatives were developed for analysis based on the following alternative selection factors: meet Antiterrorism Force Protection requirements, provide security for personnel and facilities, and maintain the vehicle/watercraft access road to Mary's Landing from the Housing Area. The Navy is also considering environmental impacts and costs. Alternatives include a No Action Alternative and four action alternatives that meet the purpose of and need for the Proposed Action while minimizing environmental impacts.

No Action Alternative. No security improvements would be constructed or installed. The property would remain unfenced and open to unauthorized access by trespassers. The No Action Alternative is used to analyze the consequences of not undertaking the Proposed Action and provides a benchmark enabling decision-makers to compare the magnitude of environmental effects of the

action alternatives. The No Action Alternative is carried forward for analysis as required by the National Environmental Policy Act (NEPA) regulations and Navy policy.

- **Alternative 1 (Preferred Alternative): Install Perimeter Security Fence with Elevated Patrol Road and Culverts.** Under Alternative 1, installation of a chain-link perimeter security fence and patrol road would enclose the NNPTC, NHCC, barracks, and associated parking areas. This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 14.90 acres.
- **Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts.** The fence alignment under Alternative 2 would be the same as Alternative 1; however, wetland areas and ditches would be low water crossings, the patrol road would not be elevated, and no culverts would be installed.
- **Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road.** The fence alignment under Alternative 3 would be the same as Alternative 1; however, the patrol road would not be continuous. In areas without a patrol road, the clear zone would be 20 feet. The wetland areas would not be traversed by a patrol road at the crossings and the fence would need to have security features (e.g., higher fence height, double outriggers, and/or a waiver from the Antiterrorism Force Protection clear zone standards).
- **Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking.** The fence alignment for Alternative 4 would be the same as Alternative 1 except the student parking area would not be enclosed. The fence would be longer since the route would not be as direct as it would be if the student parking area were being enclosed. This alternative would require an additional access road (0.34 acre) and a minimum of two more pedestrian gates. This alternative would require additional security measures such as: military personnel in a guard shack to monitor and maintain security of the parking area.

ES.4 Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Table ES-1 summarizes potential impacts to the resources associated with each of the alternative actions analyzed.

ES.5 Public Involvement

The Navy conducted scoping early in the NEPA process. Letters were sent to agencies to request their input and comments. Pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] parts 1500 to 1508) implementing the NEPA, 42 U.S.C. section 4331 et seq., and in accordance with 32 CFR part 989, *Air Force Environmental Impact Analysis Process Procedures*, and Navy regulations implementing NEPA (32 CFR part 775) and Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, the Navy (and the Department of the Air Force, as cooperating agency) gave notice that a Draft Environmental Assessment (EA) had been prepared. The notification also served to provide early notice of compliance with Executive Order 11990, *Protection of Wetlands*. State and federal regulatory agencies with special expertise in wetlands have been contacted to provide comment. The notice appeared in *The Post and Courier* (Charleston County, South Carolina) for three consecutive days. A 30-day public comment period followed the notice.

The Draft EA and Draft Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) for the action were made available at the following website:

https://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/southeast/about_us/environmental_planning.html.

Comments received will be considered in preparing the Final EA and FONSI/FONPA. A Notice of Availability of the Final EA and FONSI/FONPA will be published in *The Post and Courier*.

Table ES-1 Summary of Potential Impacts by Alternative

Resource Area	No Action Alternative	Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts	Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts	Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road	Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking
Water Resources	<ul style="list-style-type: none"> No change to existing water resources. 	<ul style="list-style-type: none"> Approximately 2.97 acres of wetland and 161.7 linear feet of stream would be disturbed. Approximately 14.90 acres would be disturbed with 3.59 acres for the permanent patrol road. Construction would result in temporary impacts to water quality that will be mitigated by BMPs. Operations could result in long-term impacts to water quality. The Navy will apply herbicides in accordance with the label and IPMP and use BMPs for gas-powered equipment. No impacts to floodplains would occur. 	<ul style="list-style-type: none"> Impacts would be similar to Alternative 1 but slightly less since this alternative would not require four new culverts or culvert extensions and the depth of fill would be less since the patrol road would not be elevated. 	<ul style="list-style-type: none"> Approximately 1.37 acres of wetland and 65.5 linear feet of stream would be disturbed. Approximately 8.74 acres would be disturbed with 1.03 acre for the permanent, partial, patrol road. Construction and operation would result in temporary impacts to water quality that will be mitigated by BMPs. Operations could result in long-term impacts to water quality. The Navy will apply herbicides in accordance with the label and IPMP and use BMPs for gas-powered equipment. No impacts to floodplains would occur. 	<ul style="list-style-type: none"> Approximately 4.78 acres of wetland and 183.5 linear feet of stream would be disturbed. Approximately 15.71 acres would be disturbed with 3.81 acres for the permanent patrol road and access road. Construction and operation would result in temporary impacts to water quality that will be mitigated by BMPs. Operations could result in long-term impacts to water quality. The Navy will apply herbicides in accordance with the label and IPMP and use BMPs for gas-powered equipment. No impacts to floodplains would occur.

Table ES-1 Summary of Potential Impacts by Alternative

<i>Resource Area</i>	<i>No Action Alternative</i>	<i>Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking</i>
Biological Resources	<ul style="list-style-type: none"> No change to existing biological resources. 	<ul style="list-style-type: none"> Approximately 9.01 acres of the forested area would be removed. JB CHS-WS manages 8,915 acres of forestland according to the INRMP. As a result, forested area would be reduced by 0.10% under this alternative. Wildlife would be temporarily impacted during construction. Larger species would avoid the construction area. Some small, less mobile species could be impacted. Clearing of forest could impact migratory birds. Construction time limits will be implemented to the maximum extent practicable to avoid impacts to migratory birds and BCC. Alternative 1 may affect but is not likely to adversely affect the 	<ul style="list-style-type: none"> Approximately 9.01 acres of the forested area would be removed. JB CHS-WS manages 8,915 acres of forestland according to the INRMP. As a result, forested area would be reduced by 0.10% under this alternative. Wildlife would be temporarily impacted during construction. Larger species would avoid the construction area. Some small, less mobile species could be impacted. Clearing of forest could impact migratory birds. Construction time limits will be implemented to the maximum extent practicable to avoid impacts to migratory birds and BCC. Alternative 2 may affect but is not likely to adversely affect the 	<ul style="list-style-type: none"> Approximately 5.50 acres of the forested area would be removed. JB CHS-WS manages 8,915 acres of forestland according to the INRMP. As a result, forested area would be reduced by 0.06% under this alternative. Wildlife would be temporarily impacted during construction. Larger species would avoid the construction area. Some small, less mobile species could be impacted. Clearing of forest could impact migratory birds. Construction time limits will be implemented to the maximum extent practicable to avoid impacts to migratory birds and BCC. Alternative 3 may affect but is not likely to adversely affect the 	<ul style="list-style-type: none"> Approximately 10.28 acres of the forested area would be removed. JB CHS-WS manages 8,915 acres of forestland according to the INRMP. As a result, forested area would be reduced by 0.12% under this alternative. Wildlife would be temporarily impacted during construction. Larger species would avoid the construction area. Some small, less mobile species could be impacted. Clearing of forest could impact migratory birds. Construction time limits will be implemented to the maximum extent practicable to avoid impacts to migratory birds and BCC. Alternative 4 may affect but is not likely to adversely affect the

Table ES-1 Summary of Potential Impacts by Alternative

<i>Resource Area</i>	<i>No Action Alternative</i>	<i>Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking</i>
		RCW and wood stork. No effect on northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry. USFWS concurred with the Navy's conclusions in a letter dated June 12, 2019.	RCW and wood stork. No effect on northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry. USFWS concurred with the Navy's conclusions in a letter dated June 12, 2019.	RCW and wood stork. No effect on northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry. USFWS concurred with the Navy's conclusions in a letter dated June 12, 2019.	RCW and wood stork. No effect on northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry. USFWS concurred with the Navy's conclusions in a letter dated June 12, 2019.
Land Use	<ul style="list-style-type: none"> No change to existing land use. 	<ul style="list-style-type: none"> Consistent with the JB CHS IDP and the Goose Creek Comprehensive Plan. The IDP identifies the security fence as a recommended future project. Reduction of open space would have a minor impact on the IDP existing land use map. 	<ul style="list-style-type: none"> Land use impacts for Alternative 2 would be the same as Alternative 1. 	<ul style="list-style-type: none"> Land use impacts for Alternative 3 would be the same as Alternative 1. 	<ul style="list-style-type: none"> Land use impacts for Alternative 4 would be the same as Alternative 1.

Table ES-1 Summary of Potential Impacts by Alternative

Resource Area	No Action Alternative	Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts	Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts	Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road	Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking
Geological Resources (Soils)	<ul style="list-style-type: none"> No change to existing soil conditions. 	<ul style="list-style-type: none"> Impacts to soils that are hydric and prone to compaction, erosion, low revegetation potential, and corrosion could occur. Use of construction BMPs specified in the SWPPP and erosion control plan would mitigate impacts to soils. 	<ul style="list-style-type: none"> Soil impacts under Alternative 2 would be similar to Alternative 1. 	<ul style="list-style-type: none"> Soil impacts under Alternative 3 would be similar to Alternative 1. 	<ul style="list-style-type: none"> Soil impacts under Alternative 4 would be similar to Alternative 1.
Cultural Resources	<ul style="list-style-type: none"> No change to existing cultural resources. 	<ul style="list-style-type: none"> There are no NRHP-listed or NRHP-eligible archaeological resources or architectural resources within the APE; therefore, no impact. The SC SHPO was consulted and concurred with the finding of no effects to historic properties. No historic properties would be affected by implementation of any of the alternatives as determined in consultation with the SC SHPO. 	<ul style="list-style-type: none"> There are no NRHP-listed or NRHP-eligible archaeological resources or architectural resources within the APE; therefore, no impact. The SC SHPO was consulted and concurred with the finding of no effects to historic properties. No historic properties would be affected by implementation of any of the alternatives as determined in consultation with the SC SHPO. 	<ul style="list-style-type: none"> There are no NRHP-listed or NRHP-eligible archaeological resources or architectural resources within the APE; therefore, no impact. The SC SHPO was consulted and concurred with the finding of no effects to historic properties. No historic properties would be affected by implementation of any of the alternatives as determined in consultation with the SC SHPO. 	<ul style="list-style-type: none"> There are no NRHP-listed or NRHP-eligible archaeological resources or architectural resources within the APE; therefore, no impact. The SC SHPO was consulted and concurred with the finding of no effects to historic properties. No historic properties would be affected by implementation of any of the alternatives as determined in consultation with the SC SHPO.

Table ES-1 Summary of Potential Impacts by Alternative

<i>Resource Area</i>	<i>No Action Alternative</i>	<i>Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking</i>
		<ul style="list-style-type: none"> The Navy coordinated with the Catawba Indian Nation, the only federally recognized tribe in South Carolina. In a letter dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area. 	<ul style="list-style-type: none"> The Navy coordinated with the Catawba Indian Nation, the only federally recognized tribe in South Carolina. In a letter dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area. 	<ul style="list-style-type: none"> The Navy coordinated with the Catawba Indian Nation, the only federally recognized tribe in South Carolina. In a letter dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area. 	<ul style="list-style-type: none"> The Navy coordinated with the Catawba Indian Nation, the only federally recognized tribe in South Carolina. In a letter dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area.
Infrastructure	<ul style="list-style-type: none"> No change to existing infrastructure. No beneficial impacts to infrastructure as a result of improvements to antiterrorism vulnerabilities and terrorist threats. 	<ul style="list-style-type: none"> A fence and clear zone would mitigate antiterrorism vulnerabilities and terrorist threats; therefore, would be beneficial. During construction, there would be a temporary increase in the number of workers at the installation using utilities. After 	<ul style="list-style-type: none"> A fence and clear zone would mitigate antiterrorism vulnerabilities and terrorist threats; therefore, would be beneficial. During construction, there would be a temporary increase in the number of workers at the installation using utilities. After 	<ul style="list-style-type: none"> A fence and clear zone would mitigate antiterrorism vulnerabilities and terrorist threats; therefore, would be beneficial. During construction, there would be a temporary increase in the number of workers at the installation using utilities. After 	<ul style="list-style-type: none"> A fence and clear zone would mitigate antiterrorism vulnerabilities and terrorist threats; therefore, would be beneficial. During construction, there would be a temporary increase in the number of workers at the installation using utilities. After

Table ES-1 Summary of Potential Impacts by Alternative

<i>Resource Area</i>	<i>No Action Alternative</i>	<i>Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking</i>
		construction, there would be a slight increase in the need for electricity for lighting. However, LED lights would be used to lessen energy use.	construction, there would be a slight increase in the need for electricity for lighting. However, LED lights would be used to lessen energy use.	construction, there would be a slight increase in the need for electricity for lighting. However, LED lights would be used to lessen energy use.	construction, there would be a slight increase in the need for electricity for lighting. However, LED lights would be used to lessen energy use.
Air Quality	<ul style="list-style-type: none"> No change to existing air quality. 	<ul style="list-style-type: none"> Impacts would be minor and temporary. No regulatory thresholds would be exceeded. 	<ul style="list-style-type: none"> Impacts would be minor and temporary. No regulatory thresholds would be exceeded. 	<ul style="list-style-type: none"> Impacts would be minor and temporary. No regulatory thresholds would be exceeded. 	<ul style="list-style-type: none"> Impacts would be minor and temporary. No regulatory thresholds would be exceeded.
Noise	<ul style="list-style-type: none"> No change to the existing noise environment. 	<ul style="list-style-type: none"> Construction would result in temporary, localized increases in noise levels. Noise would occur during normal working hours; therefore, construction noise would have minimal impacts. 	<ul style="list-style-type: none"> Construction would result in temporary, localized increases in noise levels. Noise would occur during normal working hours; therefore, construction noise would have minimal impacts. 	<ul style="list-style-type: none"> Construction would result in temporary, localized increases in noise levels. Noise would occur during normal working hours; therefore, construction noise would have minimal impacts. 	<ul style="list-style-type: none"> Construction would result in temporary, localized increases in noise levels. Noise would occur during normal working hours; therefore, construction noise would have minimal impacts.
Public Health and Safety	<ul style="list-style-type: none"> No change to existing public health and safety conditions. No beneficial impact to existing public health and safety. 	<ul style="list-style-type: none"> Construction of the fence and clear zone would improve physical security and Antiterrorism Force Protection, a beneficial impact. 	<ul style="list-style-type: none"> Construction of the fence and clear zone would improve physical security and Antiterrorism Force Protection, a beneficial impact. 	<ul style="list-style-type: none"> Construction of the fence and clear zone would improve physical security and Antiterrorism Force Protection, a beneficial impact. 	<ul style="list-style-type: none"> Construction of the fence and clear zone would improve physical security and Antiterrorism Force Protection, a beneficial impact.

Table ES-1 Summary of Potential Impacts by Alternative

Resource Area	No Action Alternative	Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts	Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts	Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road	Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking
Hazardous Materials and Wastes	<ul style="list-style-type: none"> No change to existing hazardous materials and wastes. 	<ul style="list-style-type: none"> Negligible increases to hazardous materials use and generation of hazardous wastes. No impacts resulting from special hazards. No impacts on active ERP sites. 	<ul style="list-style-type: none"> Negligible increases to hazardous materials use and generation of hazardous wastes. No impacts resulting from special hazards. No impacts on active ERP sites. 	<ul style="list-style-type: none"> Negligible increases to hazardous materials use and generation of hazardous wastes. No impacts resulting from special hazards. No impacts on active ERP sites. 	<ul style="list-style-type: none"> Negligible increases to hazardous materials use and generation of hazardous wastes. No impacts resulting from special hazards. No impacts on active ERP sites.
Socioeconomics	<ul style="list-style-type: none"> No change to the existing socioeconomics of the local area or region surrounding JB CHS-WS. 	<ul style="list-style-type: none"> Temporary and minor benefits to employment and earnings associated with construction. 	<ul style="list-style-type: none"> Temporary and minor benefits to employment and earnings associated with construction. 	<ul style="list-style-type: none"> Temporary and minor benefits to employment and earnings associated with construction. 	<ul style="list-style-type: none"> Temporary and minor benefits to employment and earnings associated with construction.
Environmental Justice and Protection of Children	<ul style="list-style-type: none"> No change to existing conditions that would result in disproportionately high or adverse effects on environmental justice communities or children. 	<ul style="list-style-type: none"> No disproportionately high and adverse human health or environmental effect on any minority or low-income populations. Temporary impacts, including increased traffic and construction noise, could impact children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of 	<ul style="list-style-type: none"> No disproportionately high and adverse human health or environmental effect on any minority or low-income populations. Temporary impacts, including increased traffic and construction noise, could impact children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of 	<ul style="list-style-type: none"> No disproportionately high and adverse human health or environmental effect on any minority or low-income populations. Temporary impacts, including increased traffic and construction noise, could impact children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of 	<ul style="list-style-type: none"> No disproportionately high and adverse human health or environmental effect on any minority or low-income populations. Temporary impacts, including increased traffic and construction noise, could impact children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of

Table ES-1 Summary of Potential Impacts by Alternative

<i>Resource Area</i>	<i>No Action Alternative</i>	<i>Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence with Low Water Crossing and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking</i>
		construction occurs; however, the fence would improve security in the long term.	construction occurs; however, the fence would improve security in the long term.	construction occurs; however, the fence would improve security in the long term.	construction occurs; however, the fence would improve security in the long term.

Key: APE = area of potential effect; BCC = Birds of Conservation Concern; BMPs = best management practices; ERP = Environmental Restoration Program; IDP = Installation Development Plan; INRMP = Integrated Natural Resources Management Plan; IPMP = Integrated Pest Management Plan; JB CHS = Joint Base Charleston; JB CHS-WS = Joint Base Charleston – Weapons Station; LED = light-emitting diode; NRHP = National Register of Historic Places; RCW = red-cockaded woodpecker; ROI = region of influence; SC SHPO = South Carolina State Historic Preservation Officer; SWPPP = Storm Water Pollution Prevention Plan; USFWS = United States Fish and Wildlife Service

This page intentionally left blank.

Environmental Assessment for Naval Nuclear Power Training Command Facility Perimeter Fence Construction, Joint Base Charleston, South Carolina

TABLE OF CONTENTS

Abbreviations and Acronyms	vi
1 Purpose of and Need for the Proposed Action	1-1
1.1 Introduction	1-1
1.2 Background	1-1
1.3 Location	1-3
1.4 Purpose of and Need for the Proposed Action	1-3
1.5 Scope of the Environmental Analysis	1-4
1.6 Relevant Laws and Regulations.....	1-4
1.7 Public and Agency Participation and Intergovernmental Coordination.....	1-5
2 Proposed Action and Alternatives.....	2-1
2.1 Proposed Action	2-1
2.2 Selection Factors	2-3
2.3 Alternatives Carried Forward for Analysis.....	2-6
2.3.1 No Action Alternative	2-6
2.3.2 Alternative 1 (Preferred Alternative): Install Perimeter Security Fence with Elevated Road and Culverts.....	2-6
2.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts	2-6
2.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road.....	2-8
2.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking.....	2-10
2.4 Alternatives Considered but not Carried Forward for Detailed Analysis	2-10
2.5 Best Management Practices Included in the Proposed Action	2-12
3 Affected Environment and Environmental Consequences	3-1
3.1 Water Resources	3-2
3.1.1 Regulatory Setting	3-2
3.1.2 Affected Environment	3-4
3.1.3 Environmental Consequences.....	3-7
3.2 Biological Resources	3-17
3.2.1 Regulatory Setting	3-18
3.2.2 Affected Environment	3-19

3.2.3	Environmental Consequences	3-24
3.3	Land Use.....	3-30
3.3.1	Regulatory Setting	3-30
3.3.2	Affected Environment	3-31
3.3.3	Environmental Consequences	3-32
3.4	Geological Resources	3-33
3.4.1	Regulatory Setting	3-33
3.4.2	Affected Environment	3-33
3.4.3	Environmental Consequences	3-36
3.5	Cultural Resources	3-39
3.5.1	Regulatory Setting	3-39
3.5.2	Affected Environment	3-39
3.5.3	Environmental Consequences	3-41
3.6	Infrastructure	3-43
3.6.1	Regulatory Setting	3-43
3.6.2	Affected Environment	3-43
3.6.3	Environmental Consequences	3-45
3.7	Air Quality	3-47
3.7.1	Regulatory Setting	3-47
3.7.2	Affected Environment	3-50
3.7.3	Environmental Consequences	3-51
3.8	Noise	3-54
3.8.1	Basics of Sound and A-Weighted Sound Level	3-55
3.8.2	Noise Metrics.....	3-56
3.8.3	Noise Effects.....	3-57
3.8.4	Regulatory Setting	3-57
3.8.5	Affected Environment	3-57
3.8.6	Environmental Consequences	3-58
3.9	Public Health and Safety.....	3-59
3.9.1	Regulatory Setting	3-59
3.9.2	Affected Environment	3-59
3.9.3	Environmental Consequences	3-60
3.10	Hazardous Materials and Wastes.....	3-61
3.10.1	Regulatory Setting	3-61
3.10.2	Affected Environment	3-62
3.10.3	Environmental Consequences.....	3-64
3.11	Socioeconomics	3-66
3.11.1	Regulatory Setting	3-66
3.11.2	Affected Environment	3-66
3.11.3	Environmental Consequences	3-68
3.12	Environmental Justice and Protection of Children	3-69

3.12.1	Regulatory Setting	3-69
3.12.2	Affected Environment	3-69
3.12.3	Environmental Consequences	3-72
3.13	Summary of Potential Impacts to Resources and Impact Avoidance and Minimization .	3-75
4	Cumulative Impacts	4-1
4.1	Definition of Cumulative Impacts	4-1
4.2	Scope of Cumulative Impacts Analysis	4-2
4.3	Past, Present, and Reasonably Foreseeable Actions	4-2
4.4	Cumulative Impact Analysis	4-4
4.4.1	Water Resources	4-4
4.4.2	Biological Resources	4-5
4.4.3	Land Use	4-6
4.4.4	Soils	4-7
4.4.5	Infrastructure	4-7
4.4.6	Air Quality	4-8
4.4.7	Noise	4-9
4.4.8	Public Health and Safety	4-9
4.4.9	Hazardous Materials and Wastes	4-9
4.4.10	Socioeconomics	4-10
4.4.11	Environmental Justice and Protection of Children	4-10
5	Other Considerations Required by NEPA	5-1
5.1	Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations .	5-1
5.2	Irreversible or Irretrievable Commitments of Resources	5-3
5.3	Unavoidable Adverse Impacts	5-3
5.4	Relationship between Short-Term Use of the Environment and Long-Term Productivity.	5-3
6	References	6-1
7	List of Preparers	7-1

List of Figures

Figure 1-1	Location Map	1-2
Figure 2-1	Proposed Action – Cross Section of Proposed Antiterrorism Force Protection Clear Zone	2-2
Figure 2-2	Proposed Action – Conceptual Rendering of the Fence	2-2
Figure 2-3	Alternative 1 and Alternative 4	2-7
Figure 2-4	Alternative 2 Plan View of Low Water Crossing	2-8
Figure 2-5	Alternative 3 Layout	2-9
Figure 2-6	Alternative 3 Conceptual Fence Height	2-10

Figure 2-7	Alternative 5: Perimeter Fence Including an Area for Future Development.....	2-11
Figure 3-1	Water Resources at JB CHS-WS	3-5
Figure 3-2	Location of Alternatives and Water Features at JB CHS-WS	3-9
Figure 3-3	Red-cockaded Woodpecker Management Units and Habitats	3-23
Figure 3-4	Location of the Red-cockaded Woodpecker Management Unit and the Proposed Fence/Clear Zone	3-28
Figure 3-5	Soil Types at JB CHS-WS	3-35
Figure 3-6	Utilities at JB CHS-WS	3-44
Figure 3-6	A-Weighted Sound Levels from Typical Sources	3-56
Figure 3-7	Locations of Environmental Restoration Program Sites	3-65
Figure 3-8	Minority and Low-Income Populations in Potentially Impacted Census Areas.....	3-71
Figure 3-9	Children and Elderly Populations and Sensitive Receptors in the Affected Environment	3-73

List of Tables

Table 2-1	Summary of Land Requirements for the Proposed Perimeter Fence and Patrol Road Clear Zone	2-4
Table 2-2	Selection Factors Met for Each Alternative	2-5
Table 2-3	Best Management Practices	2-12
Table 3-1	Waterbodies within the Vicinity of the Project Area.....	3-6
Table 3-2	Alternative 1 Wetland Impacts	3-11
Table 3-3	Alternative 3 Wetland Impacts	3-15
Table 3-4	Alternative 4 Wetland Impacts	3-17
Table 3-5	Threatened and Endangered Species Known to Occur or Potentially Occurring in the Region of Influence (ROI) and Critical Habitat Present in ROI	3-19
Table 3-6	Existing Soil Types and Characteristics	3-34
Table 3-7	Acreage of Soil Impacts.....	3-37
Table 3-8	Buildings Outside the NNPTC Complex within the Viewshed of the Proposed Clear Zone	3-41
Table 3-9	General Conformity <i>de minimis</i> Levels	3-48
Table 3-10	Joint Base Charleston – Air Basin Air Emissions Inventory (2014 National Emissions Inventory).....	3-51
Table 3-11	Alternative 1 Criteria Pollutant Emissions	3-52
Table 3-12	Alternative 3 Criteria Pollutant Emissions	3-53
Table 3-13	Alternative 4 Criteria Pollutant Emissions	3-54
Table 3-14	Subjective Responses to Changes in A-Weighted Decibels	3-55
Table 3-15	Environmental Restoration Program Sites Located in the Project Area.....	3-63

Table 3-16	Minority Populations in Census Block Groups and Census Tracts Potentially Impacted by the Proposed Action	3-70
Table 3-17	Low-Income Populations in Census Block Groups and Census Tracts Potentially Impacted by the Proposed Action	3-70
Table 3-18	Children and Elderly Populations in the Affected Environment	3-72
Table 3-19	Impact Avoidance and Minimization Measures	3-76
Table 4-1	Cumulative Action Evaluation	4-2
Table 5-1	Principal Federal and State Laws Applicable to the Proposed Action	5-1

Appendices

Appendix A	Public Involvement	A-1
Appendix B	Clean Water Act Documentation	B-1
Appendix C	Endangered Species Act Documentation.....	C-1
Appendix D	National Historic Preservation Act Section 106 Documentation.....	D-1
Appendix E	Tribal Government-to-Government Documentation	E-1
Appendix F	Coastal Consistency Determination	F-1
Appendix G	Air Quality Methodology and Calculations	G-1

Abbreviations and Acronyms

<i>Acronym</i>	<i>Definition</i>
628 CES/CEIE	628 th Civil Engineer Squadron/Installation Management Flight/Environmental Element
628 CES/CEO	628 th Civil Engineer Squadron/Operations Flight
AFI	Air Force Instruction
Air Force	United States Air Force
Alt	Alternative
APE	area of potential effect
AQCR	Air Quality Control Region
BCC	Birds of Conservation Concern
BCR	Bird Conservation Regions
BCWS	Berkeley County Water and Sanitation
BMPs	best management practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CVI	Commercial Vehicle Inspection
CWA	Clean Water Act
CZMA	Coastal Zone Management Act of 1972
dB	decibels
dBA	A-weighted decibels
DERP	Defense Environmental Restoration Program
DNL	day-night average sound level
DoD	Department of Defense
EA	Environmental Assessment
ECF	Entry Control Facility
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FE	federal endangered
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FT	federal threatened
GHG	greenhouse gas
HAP	hazardous air pollutant
HAZMART	Hazardous Material Pharmacy
IDP	Installation Development Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
IRP	Installation Restoration Program
JB CHS	Joint Base Charleston
JB CHS-A	Joint Base Charleston – Air
JB CHS-WS	Joint Base Charleston – Weapons Station
LED	light-emitting diode
MBTA	Migratory Bird Treaty Act
MSAT	Mobile Source Air Toxics

Acronym	Definition
MSL	mean sea level
MTS	Moored Training Ship
MVA	megavolt ampere
NAAQS	National Ambient Air Quality Standards
Navy	United States Department of the Navy
NEPA	National Environmental Policy Act
NHCC	Naval Health Clinic Charleston
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NMCI	Navy Marine Corps Intranet
NNPTC	Naval Nuclear Power Training Command
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPTU	Nuclear Power Training Unit
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
Pb	lead
PM ₁₀	suspended particulate matter less than or equal to 10 microns in diameter
PM _{2.5}	fine particulate matter less than or equal to 2.5 microns in diameter
POV	privately owned vehicle
PPV	Public/Private Venture
PSD	Prevention of Significant Deterioration
RCW	red-cockaded woodpecker
RCW MP	Red-cockaded Woodpecker Management Plan
ROI	region of influence
S1	state critically imperiled
S2	state imperiled
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SCPA	South Carolina Ports Authority
SE	state endangered
SIP	State Implementation Plan
SO ₂	sulfur dioxide
sp.	species
spp.	several species
SSURGO	Soil Survey Geographic Database
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
U.S.	United States
U.S.C.	United States Code
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compounds

This page intentionally left blank.

1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), and the Council on Environmental Quality (CEQ), Navy, and Air Force regulations for implementing NEPA. This EA assesses the potential impacts from the proposed construction of a security fence/clear zone for Naval Nuclear Power Training Command (NNPTC) and Naval Health Clinic Charleston (NHCC) facilities located at the Naval Weapons Station area of Joint Base Charleston (Figure 1-1). A 50-foot clear zone would be maintained with vegetation pruned to 8 inches in height.

The proposed project implementation would occur as early as fiscal year 2020. The Navy is the lead agency, and the U.S. Air Force is a cooperating agency for the Proposed Action and preparation of the EA because the facility is a Joint Base. A Memorandum of Agreement dated July 2011 designated the Navy as responsible for security improvements.

1.2 Background

The NNPTC was formed in 1993 by joining the Nuclear Field A School and Nuclear Power School. In accordance with the 1995 Base Closure and Realignment Act, the NNPTC relocated from Orlando, Florida, to Charleston, South Carolina, in 1998. Construction of the new command was completed in 1999 and allowed Nuclear Field A School and Nuclear Power School to be located in the same building. The Nuclear Field A School provides training for future nuclear machinist's mates, electrician's mates, and electronic technicians. The NNPTC trains officer and enlisted students in the science and engineering fields that are key to the design, operation, and maintenance of naval nuclear propulsion plants. The school is known for one of the most demanding academic programs in the U.S. military.

NNPTC consists of a training building; bachelor enlisted quarters with an associated galley and utility distribution plant building; areas for recreation, physical fitness, and administration; a dental clinic; and the NHCC. The NNPTC complex is fully manned, with over 3,600 students and 480 staff members. The NHCC opened an ambulatory care clinic on March 23, 2007 and shares the building with Ralph H. Johnson Veterans Affairs Medical Center. NHCC provides health services for more than 17,000 enrollees.

Under the 2005 Base Closure and Realignment Act, Charleston Air Force Base became Joint Base Charleston, with the Air Force responsible for operations of its air base, as well as the Naval Weapons Station in North Charleston. A Memorandum of Agreement was signed in July of 2011 designating the Navy responsible for future security improvements. Joint Base Charleston – Weapons Station (JB CHS-WS) has an entry control point, but the perimeter of the NNPTC campus is unprotected and does not meet current safety and security requirements.

Securing military installations is required by Department of Defense (DoD) codes including DoD Antiterrorism Force Protection, physical security, and Unified Facilities Criteria (UFC) standards. Physical security measures are designed to accomplish the following:

- safeguard personnel
- prevent unauthorized access to equipment, installations, material, and documents
- safeguard personnel against espionage, sabotage, damage, and theft

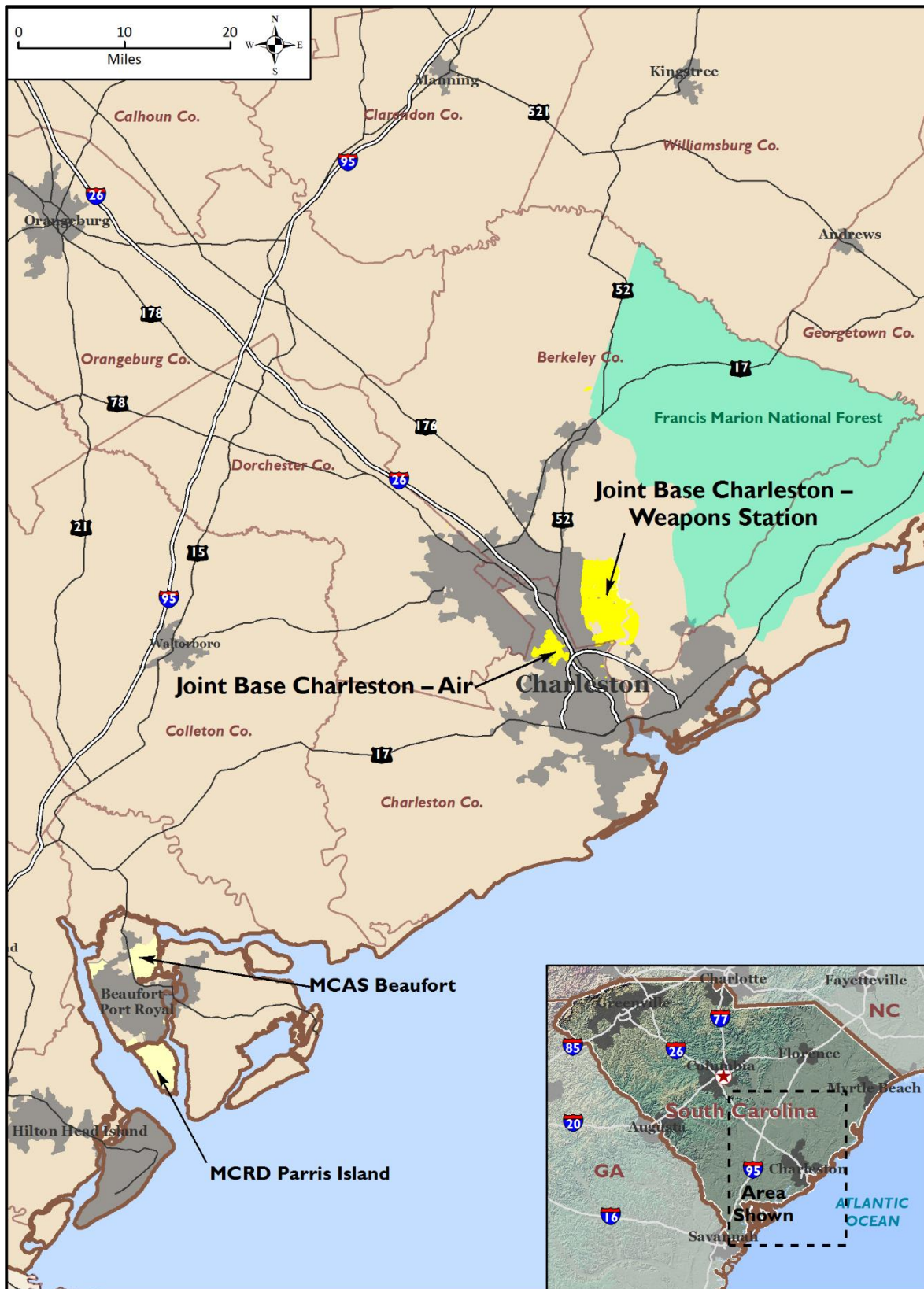


Figure 1-1 Location Map

1.3 Location

Joint Base Charleston is composed of two major enclaves: one being the airfield denoted as Joint Base Charleston – Air (JB CHS-A); the other being the former Naval Weapons Station, now denoted as JB CHS-WS. NNPTC and the NHCC are located at the JB CHS-WS in South Carolina (Figure 1-1). JB CHS-WS is approximately 12 miles north of the city of Charleston, South Carolina, in the cities of Goose Creek and Hanahan in Berkeley County. JB CHS-WS is 16,913 acres, with approximately 4.85 million square feet of building space. JB CHS-WS operates primarily as a nuclear training campus and multi-modal logistics hub for storage and transshipment of ammunition and equipment (AECOM, 2018).

1.4 Purpose of and Need for the Proposed Action

The purpose of the project is to improve the physical security at JB CHS-WS and provide the necessary level of protection for the NNPTC and NHCC facilities.

The Proposed Action is needed to prevent unauthorized personnel or vehicular access to NNPTC and NHCC and to meet current DoD Antiterrorism Force Protection criteria. The lack of adequate security measures could potentially jeopardize the ability of the NNPTC to provide the training environment essential to support its mission.

The Proposed Action would enable compliance with the following codes and guidance:

NNPTC Mission

Prepare safe and trusted Naval nuclear operators ready for follow on prototype training and, ultimately, service in the Fleet.

- **Antiterrorism Force Protection standards.** DoD implemented common criteria and minimum construction standards to mitigate Antiterrorism Force Protection vulnerabilities and terrorist threats. Antiterrorism standards consist of restrictions for on-site planning, including stand-off distances, building separation, unobstructed space, drive-up and drop-off areas, access roads, and parking; structural design; structural isolation; and electrical and mechanical design. Force Protection standards consist of establishing clear zones, restricted area boundaries, patrol roads, and access control.
- **DoD Instruction 5200.08-R, Change 1, May 27, 2009, Physical Security Program** (DoD, 2009). In accordance with DoD Instruction 5200.08, this regulation implements baseline DoD policies and minimum standards for the physical protection of DoD personnel, installations, operations, and related resources. The physical security program includes active and passive measures designed to prevent unauthorized access to personnel, equipment, installations, and information and safeguard against espionage, sabotage, terrorism, damage, and criminal activity. Physical security employs physical protective and security procedural measures in combination with active or passive systems, technologies, devices, and security personnel used to protect assets from possible threats. These measures, among others, can include the following: physical barriers and facility hardening, secure locking systems, electronic security systems, surveillance systems, protective lighting, and credential technologies.
- **Unified Facilities Criteria 4-010-01, DoD Minimum Antiterrorism Standards for Buildings** (DoD, 2018). This UFC provides minimum engineering standards to incorporate into DoD projects to provide antiterrorism mitigation measures to reduce collateral damage and the scope and severity of mass casualties in DoD buildings or in the event of a terrorist attack.

- **Unified Facilities Criteria 4-022-03, Security Fences and Gates.** UFC provides a unified approach for the design, selection, and installation of security fences and gates. Security fences and gates are used to define installation perimeters and provide a physical and psychological deterrent to entry, preventing unauthorized personnel from entering a protected area (DoD, 2013). A security fence also provides notice of legal boundary; assists in controlling and screening authorized entries; supports surveillance, detection, assessment, and other security functions; deters casual intruders from trespassing; and causes a delay in obtaining access to an installation/facility (DoD, 2013).
- **Chief of Naval Operations Instruction 5530.14E, Navy Physical Security and Law Enforcement Program.** The primary objective of the Navy Security Program is to safeguard personnel, property, facilities, and material and to enforce laws, rules, and regulations at Navy installations, activities, and operational commands (Navy, 2017).
- **Navy Tactics, Techniques, and Procedures 3-07.2.3, Law Enforcement and Physical Security.** Physical security is defined as physical measures designed to safeguard personnel; to prevent unauthorized access to equipment, installations, material, and documents; and to safeguard against espionage, sabotage, damage, and theft (Navy, 2011). Prevention and protection are components of the physical security program; both serve the security interests of people, equipment, and property. The overall security at an installation includes policy and resources to safeguard personnel, protect property, and prevent losses (Navy, 2011). Physical security also incorporates means and measures for antiterrorism readiness (Navy, 2011).

1.5 Scope of the Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No Action Alternative. The environmental resource areas analyzed in this EA include: water resources, biological resources, land use, geological resources, cultural resources, infrastructure, air quality, noise, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or impacts the resource. For instance, the study area for geological resources may only include the construction footprint of a building, whereas the noise study area would expand out to include areas that may be impacted by airborne, range, or construction noise.

1.6 Relevant Laws and Regulations

The Navy has prepared this EA based upon federal and state laws, statutes, regulations, and policies pertinent to the implementation of the Proposed Action, including the following:

- NEPA (42 United States Code [U.S.C.] sections 4321–4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] parts 1500–1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Air Force regulations for implementing NEPA (32 CFR part 989), *Environmental Impact Analysis Process (EIAP)*, which is the Air Force’s NEPA compliance program

- Clean Air Act (42 U.S.C. sections 7401 et seq.)
- Clean Water Act (33 U.S.C. sections 1251 et seq.)
- Rivers and Harbors Act (33 U.S.C. section 407)
- Coastal Zone Management Act (16 U.S.C. sections 1451 et seq.)
- National Historic Preservation Act (54 U.S.C. sections 300101 et seq.)
- Endangered Species Act (16 U.S.C. sections 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. sections 1801 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. sections 703–712)
- Bald and Golden Eagle Protection Act (16 U.S.C. sections 668–668d)
- Comprehensive Environmental Response and Liability Act (42 U.S.C. sections 9601 et seq.)
- Emergency Planning and Community Right-to-Know Act (42 U.S.C. sections 11001–11050)
- Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. sections 136 et seq.)
- Resource Conservation and Recovery Act (42 U.S.C. sections 6901 et seq.)
- Toxic Substances Control Act (15 U.S.C. sections 2601–2629)
- Farmland Protection Policy Act (7 U.S.C. sections 4201 et seq.)
- Executive Order (EO) 11988, *Floodplain Management*
- EO 11990, *Protection of Wetlands*
- EO 12088, *Federal Compliance with Pollution Control Standards*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- EO 13834, *Efficient Federal Operations*

1.7 Public and Agency Participation and Intergovernmental Coordination

CEQ regulations direct federal agencies to involve other federal, state, and local agencies and the public in preparing and implementing their NEPA procedures. A scoping letter (Appendix A, Public Involvement) was prepared and sent to the following agencies:

- U.S. Army Corps of Engineers, Charleston District
- Environmental Protection Agency, Region 4
- South Carolina State Clearinghouse
- South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management
- U.S. Fish and Wildlife Service, South Carolina Ecological Services
- Berkeley County School District

Comments received to date include a response from the U.S. Environmental Protection Agency, Region 4 and the U.S. Fish and Wildlife Service (Appendix A).

Pursuant to CEQ regulations (40 CFR parts 1500 to 1508) implementing the NEPA, 42 U.S.C. section 4331 et seq., and in accordance with 32 CFR part 989, *Air Force Environmental Impact Analysis Process Procedures*, and Navy regulations implementing NEPA (32 CFR part 775) and Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, the Navy (and the Department of the Air Force, as cooperating agency) gave notice that a Draft EA had been prepared. The notification also served to provide early notice of compliance with EO 11990, *Protection of Wetlands*. State and federal regulatory agencies with special expertise in wetlands have been contacted to provide comment. The notice appeared in *The Post and Courier* (Charleston County, South Carolina) for three consecutive days. A 30-day public comment period followed the notice.

The Draft EA and Draft Finding of No Significant Impact/Finding of No Practicable Alternative for the action were made available at the following website:

https://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/southeast/about_us/environmental_planning.html.

In addition, the Draft EA was provided to the Dorchester Road Regional Library in North Charleston, South Carolina and the JB CHS-WS Branch Library in Goose Creek, South Carolina. Comments received will be considered in preparing the Final EA and FONSI/FONPA. A Notice of Availability of the Final EA and FONSI/FONPA will be published in *The Post and Courier*.

Interagency and intergovernmental coordination included the following:

- U.S. Army Corps of Engineers, Charleston District, Section 404 of the Clean Water Act (Appendix B) and South Carolina Department of Health and Environmental Control, Section 401 Water Quality Certification
- U.S. Fish and Wildlife Service, section 7 of the Endangered Species Act (Appendix C); and South Carolina Department of Natural Resources, Title 50 Fish, Game, and Watercraft of South Carolina Code
- South Carolina State Historic Preservation Office, Section 106 of the National Historic Preservation Act (Appendix D)
- South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management, Coastal Consistency Determination (Appendix F)

The Navy conducted government-to-government consultation with the Catawba Indian Nation, the only federally recognized American Indian Tribe in South Carolina. In a response dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area. Correspondence is provided in Appendix E, Tribal Government-to-Government Documentation.

2 Proposed Action and Alternatives

2.1 Proposed Action

The United States Navy (Navy) proposes to construct a perimeter security fence/clear zone and associated support structures around Naval Nuclear Power Training Command (NNPTC) and Naval Health Clinic Charleston (NHCC). The project area perimeter currently has limited security fencing and, depending on the alternative selected, could include fencing up to 2.80 miles. This is not a proposal for a fence around the overall facility (Joint Base Charleston-Weapons Station [JB CHS-WS]). The Proposed Action includes construction of:

- a security fence
- vehicle and pedestrian access gates
- 12-foot-wide gravel patrol road
- lighting

The Proposed Action would create a 50-foot Antiterrorism Force Protection clear zone where vegetation would be pruned and maintained at 8 inches in height. Figure 2-1 provides a cross section of the fence installation, and Figure 2-2 presents a schematic and conceptual rendering of the fence.

Fence and Posts. The fence would need to be in compliance with the Department of Defense (DoD) Unified Facilities Criteria (UFC) 4-022-03, *Security Fences and Gates* (DoD, 2013). According to the UFC, the fence height should be 7 feet. The fence may be a vinyl, zinc, or aluminum-coated steel, 6-gauge chain-link fence with 2-inch square mesh and a top guard consisting of three strands of barbed wire angled outward for a total height of 8 feet. Fence posts would be spaced at 10 feet or closer and embedded into a concrete footing of 42 inches.

Gates. The locations of proposed pedestrian and vehicle gates are shown in Figure 2-3 (in Section 2.3, Alternatives Carried Forward for Analysis). Gates designed in accordance with Antiterrorism Force Protection standards would encompass approximately 40 to 60 feet of hard surface. Electrical power conduits would be installed. Vehicle gates would need approximately 0.03 acre while pedestrian gates would be 6 feet by 6 feet.

Antiterrorism Force Protection Clear Zone. The UFC specifies that a clear zone must be established around the fence and maintained with ground cover less than 8 inches. The clear zone is defined as areas around the fence to provide unobstructed views to enhance detection and assessment (DoD, 2013). The Proposed Action would include clearing a 50-foot-wide corridor consisting of a 30-foot-wide area inside of the fence line and a 20-foot-wide area outside of the fence line (Figure 2-1). This corridor would be permanently maintained with vegetation pruned to a height of less than 8 inches. After construction, the fence line and clear zone would need to be maintained. This would include mowing,

Chain-link Fences (DoD, 2013)

- Chain-link is defined as helically wound wire interwoven to provide a continuous mesh without knots or ties.
- Posts should be vertical plus or minus 2 degrees in either direction.
- Posts must be embedded and encased in concrete.
- Steel truss rods should be used for bracing and must be a minimum of 5/16 inch.
- Three strands of barbed wire are equally spaced at a 45-degree angle.

vegetation trimming, and use of herbicides. Annual application plus some spot treating may be necessary. However, only authorized herbicides would be used and their use would be in accordance with the label and procedures documented in the base's Integrated Pest Management Plan.

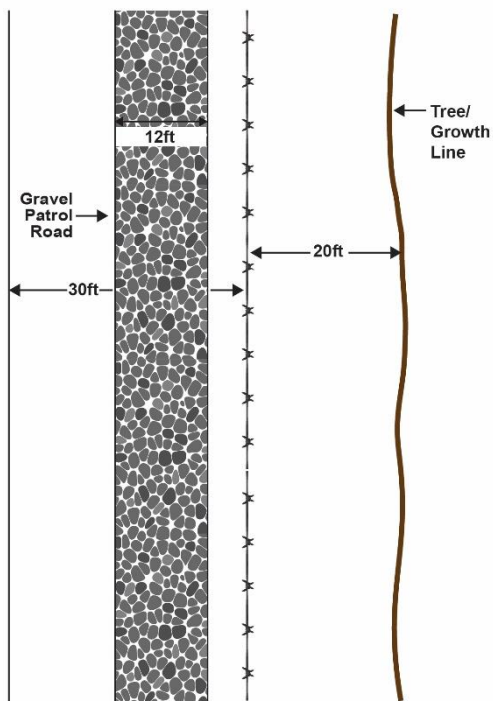


Figure 2-1 Proposed Action – Cross Section of Proposed Antiterrorism Force Protection Clear Zone

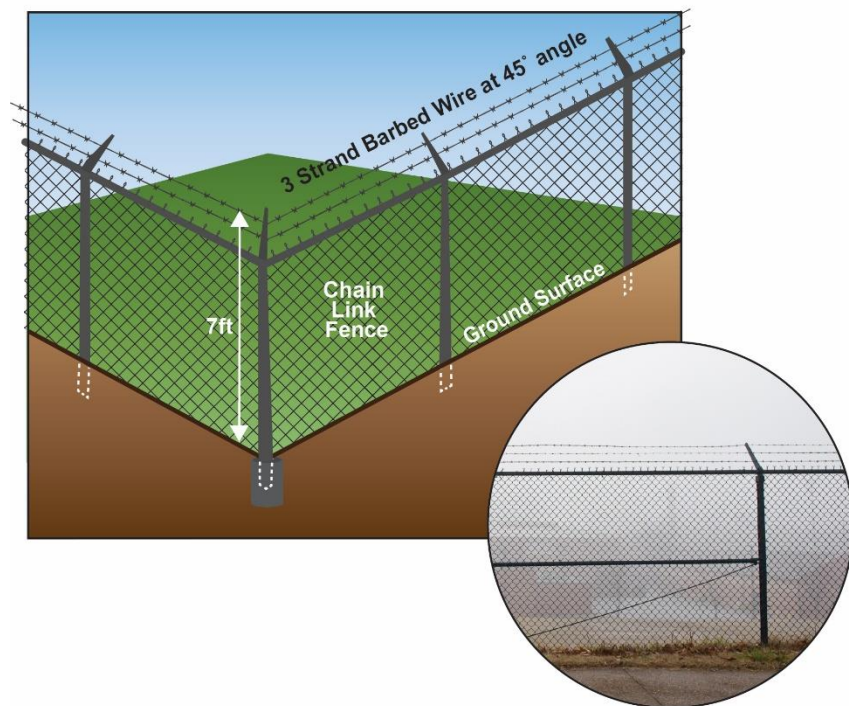


Figure 2-2 Proposed Action – Conceptual Rendering of the Fence

Patrol Road. A 12-foot-wide permanent, all-weather, perimeter road would be constructed within the inner clear zone. Drainage ditches parallel to the patrol road would be designed to use shallow or low-angle side slopes to prevent obscuring observation from a 4-foot-high line-of-sight above the road surface (DoD, 2013). The patrol road would be cleared and grubbed, soils would be compacted, and the subbase and base would be applied to support the bearing capacity of the low-volume traffic. The patrol road would consist of compacted granular fill over the natural subgrade or a series of layers including compacted granular fill consisting of base and subbase material provided the top 6 inches meet gradation requirements (DoD, 2004).

Lighting. Security lighting would be installed to provide illumination during periods of darkness or in areas of low visibility to aid in the detection, delay, and response functions of a physical security system. Approximately 32 light poles will be installed at depths of 48–60 inches deep. The light poles would be located within the clear zone and installed outside of wetland areas.

Drainage Culverts and Utility Openings. Protective measures would be provided for crossings of culverts, storm drains, sewers, and utility openings. Any drainage culverts or utility openings that pass through fence clear zones or traverse under or through security fences would be in compliance with UFC 4-022-03, section 2-12.6 through 2-12.7. Approximately four new or extended culverts would be needed. Three culverts that would be extended approximately 15 to 20 feet to have the fence be above the culvert to prevent the fence from being washed out.

Construction Timeline. Approximately 400 linear feet of fencing would be installed per day (Navy, 2015), but would vary based on specific conditions/terrain in any given area. Construction would take six months to one year. The proposed project implementation would occur as early as fiscal year 2020.

2.2 Selection Factors

The implementing regulations of the National Environmental Policy Act (NEPA) provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need require detailed analysis.

Potential alternatives that meet the purpose and need were evaluated against the following selection factors:

- provide security for personnel and facilities
- meet Antiterrorism Force Protection requirement for a 50-foot clear zone with a patrol road or obtain a waiver
- maintain the vehicle/watercraft access road to Mary's Landing from the Housing Area

Other factors considered in the decision-making process included whether an alternative minimized environmental impacts, provided space for future development, and was cost effective.

Various alternatives were evaluated against the selection factors. The alternatives considered include:

- No Action Alternative
- Alternative 1: Install Perimeter Security Fence/Clear Zone with Elevated Patrol Road and Culverts
- Alternative 2: Install Perimeter Security Fence/Clear Zone with Low Water Crossings and No Culverts
- Alternative 3: Install Perimeter Security Fence/Clear Zone without a Continuous Patrol Road
- Alternative 4: Install Perimeter Security Fence/Clear Zone without Enclosing the Student Parking
- Alternative 5: Install Perimeter Security Fence/Clear Zone including an Area for Future Development

Alternative 5 was considered but eliminated from further consideration, as summarized in Table 2-1 and Table 2-2 and explained in Section 2.4 (Alternatives Considered but not Carried Forward for Detailed Analysis).

Table 2-1 Summary of Land Requirements for the Proposed Perimeter Fence and Patrol Road Clear Zone

<i>Resource</i>	<i>Alternative 1: Install Perimeter Security Fence/Clear Zone with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Install Perimeter Security Fence/Clear Zone with Low Water Crossings and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence/Clear Zone without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence/Clear Zone without Enclosing the Student Parking</i>	<i>Alternative 5: Install Perimeter Security Fence/Clear Zone including an Area for Future Development*</i>
Fence and Patrol Road (miles)	2.47	2.47	2.47 (patrol road would be 0.71 mile)	2.56 (a new access road would be 0.06 mile)	2.80
Number of gates	vehicle (2) pedestrian (5)	vehicle (2) pedestrian (5)	vehicle (2) pedestrian (5)	vehicle (2) pedestrian (7)	vehicle (4) pedestrian (9)
Wetland areas (acres)	2.97 • Four culverts and/or extensions would be installed. • Fill would be required to elevate the fence and patrol road in wetland areas.	Less than 2.97 • No new culverts or culvert extensions would be needed. • Less depth of fill for the patrol road would be required with the low water crossings.	1.37	4.78	3.94
Stream (linear feet)	161.7 • Four culverts and/or extensions would be installed. • Fill would be required to elevate the fence and patrol road traversing the streams.	Less than 161.7 • Natural hydrology would be maintained. • Patrol road would not be accessible during rain and storm events.	65.5 • Patrol road would not traverse streams but fence would need to be continuous	183.5	97.6
Disturbance Area – Fence and Patrol Road (acres)	14.90	14.90	8.74	15.37 Access Road: 0.34	16.87
Land Use within the Disturbance Area					
-Forest stand (acres)	9.01	9.01	5.50	10.28	13.83
-Open space (acres)	2.84	2.84	1.97	2.47	1.58
-Developed (acres)	3.05	3.05	1.27	2.96	1.46

* Alternative 5 was not carried forward for analysis.

Table 2-2 Selection Factors Met for Each Alternative

<i>Selection Factors and Other Considerations</i>	<i>No Action Alternative</i>	<i>Alternative 1: Perimeter Security Fence/Clear Zone with Elevated Patrol Road and Culverts</i>	<i>Alternative 2: Perimeter Security Fence/Clear Zone with Low Water Crossings and No Culverts</i>	<i>Alternative 3: Install Perimeter Security Fence/Clear Zone without a Continuous Patrol Road</i>	<i>Alternative 4: Install Perimeter Security Fence/Clear Zone without Enclosing the Student Parking</i>	<i>Alternative 5: Install Perimeter Security Fence/Clear Zone including an Area for Future Development*</i>
Selection Factors						
Provide security for personnel and facilities	not met	✓	✓	partially met	Would require additional security measures in the student parking area	✓
Meet Antiterrorism Force Protection requirement for a 50-foot clear zone with a patrol road or obtain waiver	not met	✓	Would require foot patrols during rain and storm events	Would need a waiver and require foot patrols since road would not be continuous	✓	✓
Maintain the vehicle/watercraft access road to Mary's Landing from the Housing Area	✓	✓	✓	✓	✓	✓
Other Factors Considered						
Acreage of wetland impacts (acres)	0 acres	2.97	Less than 2.97	1.37	4.78	3.94
Streams (linear feet)	0	161.7	Less than 161.7	65.5	183.5	97.6
Provide space for future development	✓	not met	not met	not met	not met	✓
Minimizes environmental impacts	✓	✓	✓	✓	partially met	not met

* Alternative 5 was not carried forward for analysis.

2.3 Alternatives Carried Forward for Analysis

Based on the selection factors and meeting the purpose and need for the Proposed Action, four action alternatives were identified and are analyzed in detail within this EA. Alternatives evaluated in detail were those that met the selection factors and avoided or minimized environmental impacts, specifically wetland impacts. Although the No Action Alternative would not meet the purpose of and need for the Proposed Action, it was carried forward for analysis, as required by NEPA.

2.3.1 No Action Alternative

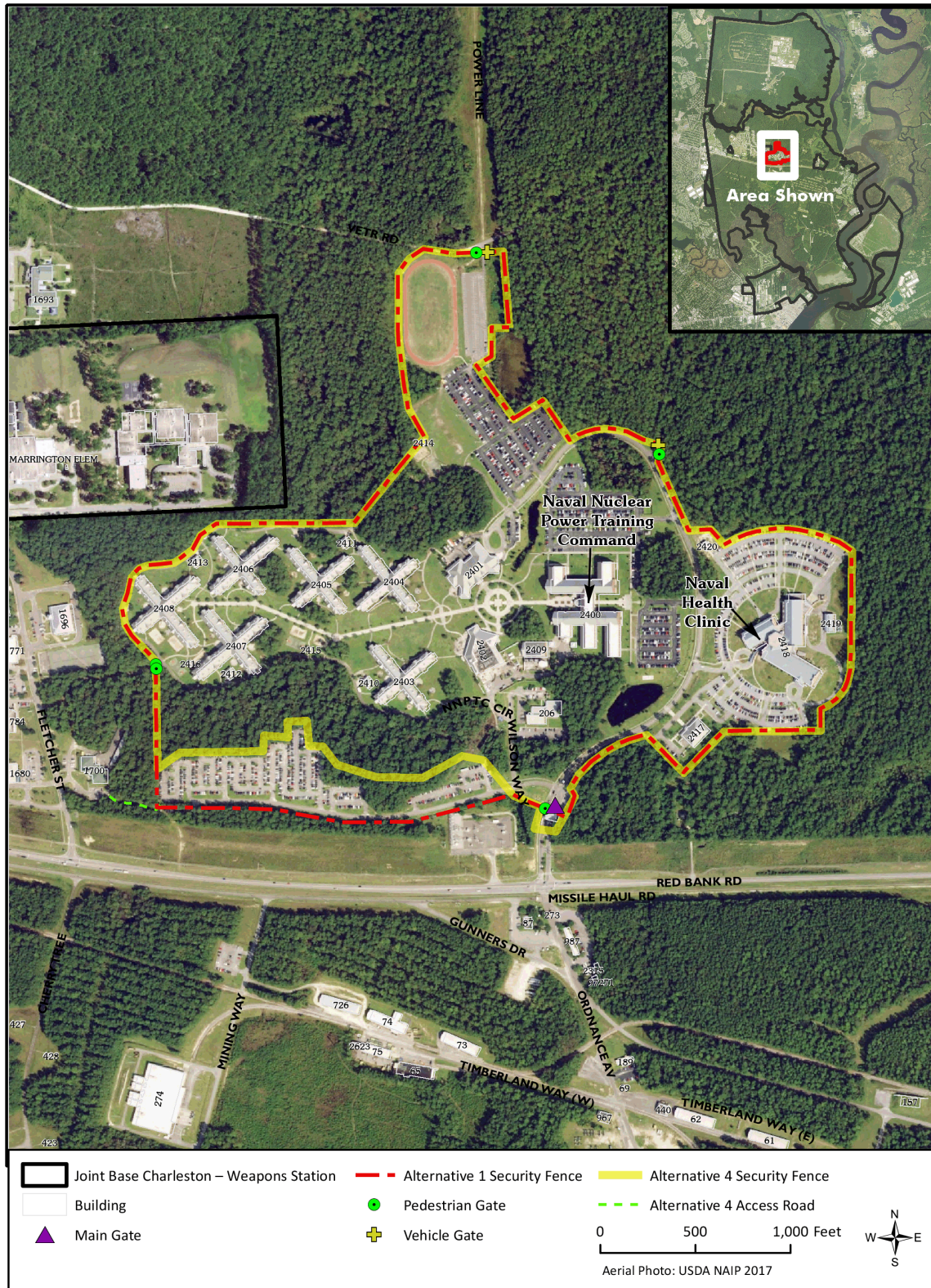
Under the No Action Alternative, no security improvements would be constructed or installed. The property would remain unfenced and open to unauthorized access by trespassers. The No Action Alternative is used to analyze the consequences of not undertaking the Proposed Action and provides a benchmark enabling decision-makers to compare the magnitude of environmental effects of the action alternatives. The No Action Alternative is carried forward for analysis as required by NEPA regulations and Navy policy.

2.3.2 Alternative 1 (Preferred Alternative): Install Perimeter Security Fence with Elevated Road and Culverts

Under Alternative 1, installation of a chain-link perimeter security fence and patrol road would enclose the NNPTC, NHCC, barracks, and associated parking areas (Figure 2-3). This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 14.90 acres (Table 2-1). This alternative would impact 2.97 acres of wetland and 161.7 linear feet of streams. New culverts and three culvert extensions would be required. The proposed fence alignment would not enclose an area proposed for future Navy development; however, as part of the 10-year base development planning process, future development in this area is not reasonably foreseeable. This alternative is preferred because it provides a balance between meeting security needs without requiring a waiver or additional security measures, manages the amount of wetland and streams impacted, and reduces the length of fence and associated cost.

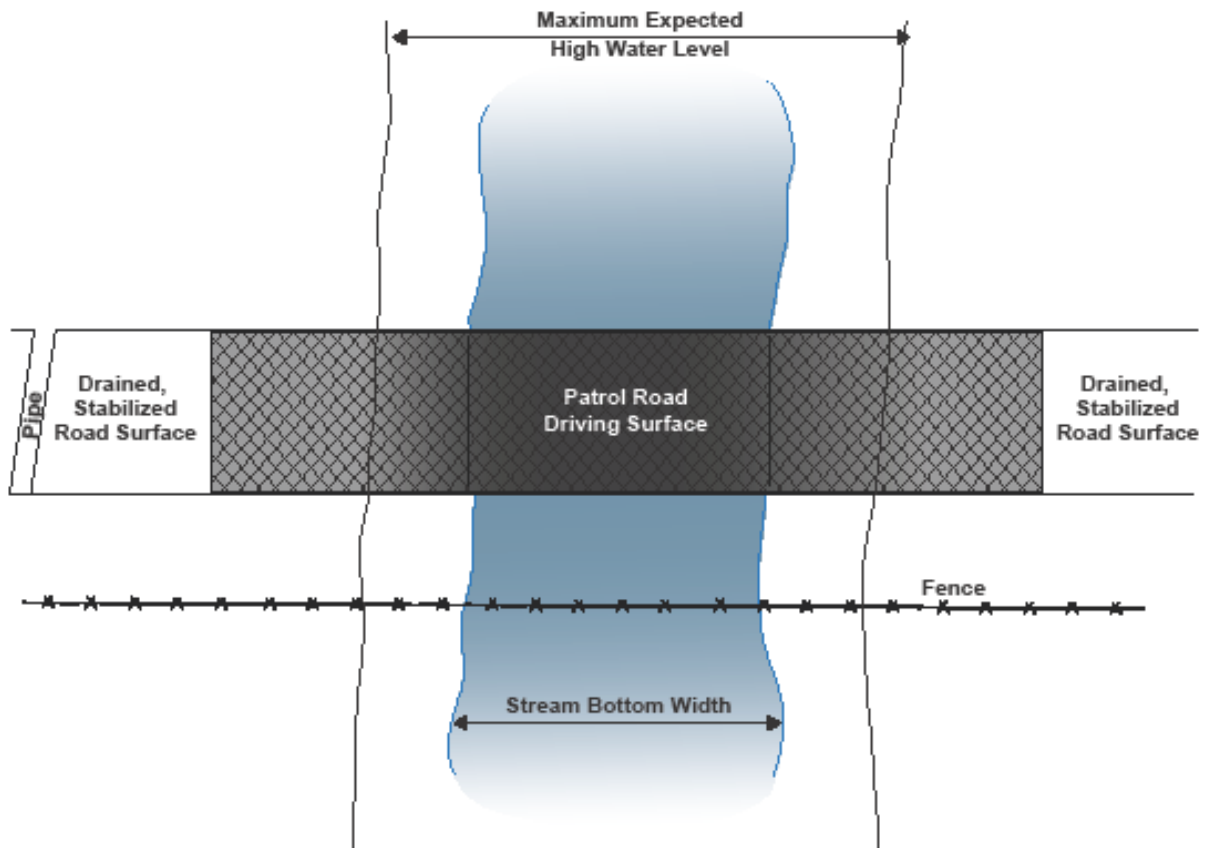
2.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The fence alignment under Alternative 2 would be the same as Alternative 1; however, wetland areas and ditches would be traversed using a low water crossing (Figure 2-4). The Navy would install rip-rap/Number 57 stone at the existing grade. The patrol road would not be elevated and no culverts would be installed. As a result, this alternative would impact slightly less wetland and stream areas as Alternative 1 because the low water crossings would require less depth of fill and no new culverts or culvert extensions. The low water crossings would not be accessible by patrol vehicles during rain and flooding events and other patrol measures (e.g., security staff on foot patrols) would be required. This would result in needing more staff, patrols taking longer, and additional cost.



NOTE: The Alternative 2 and 3 fence routes are the same as Alternative 1.

Figure 2-3 Alternative 1 and Alternative 4



Source: (US Department of Agriculture, Forest Service, 2006)

Note: Not to scale.

Figure 2-4 Alternative 2 Plan View of Low Water Crossing

2.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

Under Alternative 3, the fence alignment would be the same as Alternative 1; however, wetland areas and ditches would not be filled or culverted. This alternative would include 2.47 miles of fencing but the patrol road would be 0.71 mile. Total temporary and permanent disturbance would consist of 8.74 acres (Table 2-1). Figure 2-5 provides a plan view of Alternative 3. The patrol road at wetland and waterbody areas would not traverse the wetland. As a result, this alternative would impact 1.37 acres of wetland and 65.5 linear feet of streams. The wetland areas would have a smaller clear zone (20 feet) at the crossings but the fence would need to have additional security features (e.g., higher fence height [Figure 2-6], double outriggers, and/or a waiver from the Antiterrorism Force Protection standards). Although this alternative would have the least impact to wetlands and streams, the 0.71-mile non-continuous road would not fully provide security patrols by vehicle and therefore would not be preferred. Security would have to be augmented with foot patrols, resulting in more cost.

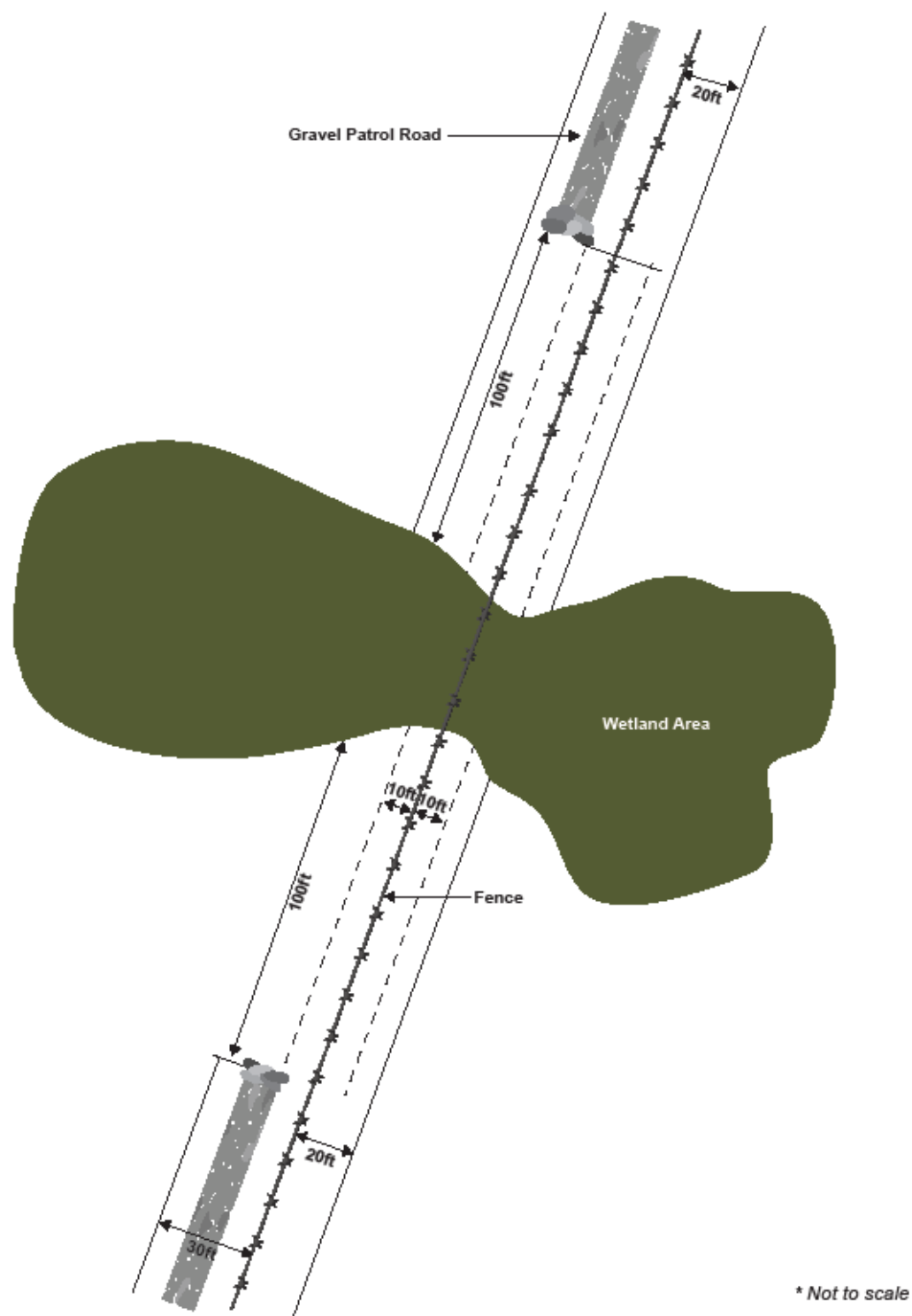
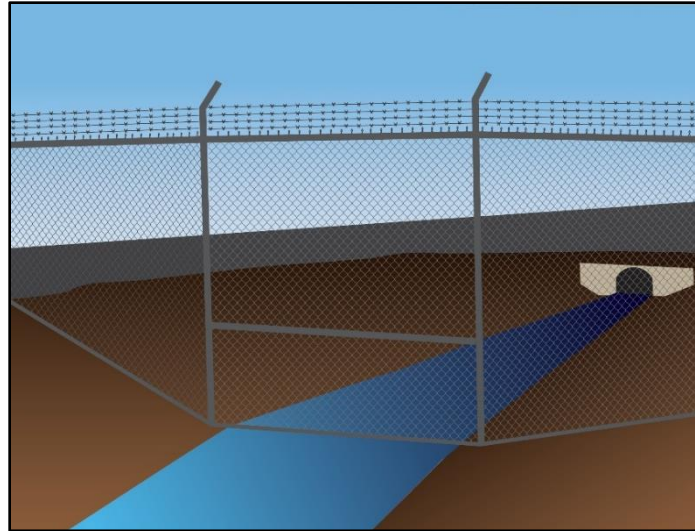


Figure 2-5 Alternative 3 Layout



Source: (DoD, 2013)

Figure 2-6 Alternative 3 Conceptual Fence Height

2.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

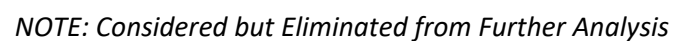
Under Alternative 4, the fence alignment would be the same as Alternative 1 except the student parking area would not be enclosed. This alternative would include 2.56 miles of fencing and patrol road (Figure 2-3). Total temporary and permanent disturbance would consist of 15.71 acres (Table 2-1). This alternative would impact 4.78 acres of wetland and 183.5 linear feet of streams. This alternative would require an additional access road (0.34 acre) and a minimum of two more pedestrian gates. Alternative measures would be required to provide security for the student parking area and could include construction of additional guard stations and adding security personnel. The fence alignment would be longer since the route would not be as direct as enclosing the student parking area. This alternative would impact the most wetland areas and streams and would not enclose the student parking area with the fence and patrol road; therefore, this alternative would not be preferred.

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

Alternative 5 was considered but not carried forward for detailed analysis in this EA. This alternative met the reasonable alternative selection factors as presented in Section 2.2 (Selection Factors); however, no future development in the area has been identified in the 10-year military construction plans.

Alternative 5: Install Perimeter Security Fence including an Area for Future Development

Under Alternative 5, installation of a chain-link perimeter security fence and patrol road would follow the perimeter of the developed property (Figure 2-7), including an area proposed for future development. Alternative 5 would include 2.80 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 16.87 acres. This alternative would have the longest fence and would pose the greatest ground disturbance of the alternatives considered. This alternative encloses the student parking lot and provides space for future development. Joint Base Charleston has a 10-year base development planning process. At this time, NNPTC expansion in the 10-year future (military construction) plans do not project a need for future development; therefore, this alternative was considered but not carried forward for detailed analysis.



2.5 Best Management Practices Included in the Proposed Action

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that the Navy would adopt to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the Proposed Action, (2) ongoing, regularly occurring practices, or (3) not unique to this Proposed Action. In other words, the BMPs identified in this document are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action. Table 2-3 includes a list of BMPs. Mitigation measures are discussed separately in Section 3.13 (Summary of Potential Impacts to Resources and Impact Avoidance and Minimization).

Table 2-3 Best Management Practices

<i>Resource</i>	<i>BMP Description</i>	<i>Impacts Reduced/Avoided</i>
Water Quality	As a condition of the NPDES permit for construction, the contractor would implement measures identified in the SWPPP for erosion and sediment control and stormwater BMPs. Other BMPs would be implemented to the extent practicable to satisfy the Navy Low Impact Development goal of no net increase in stormwater or nutrient loading from major construction projects.	Reduce erosion, sedimentation, and stormwater pollution during and after construction
	The Navy would acquire a Clean Water Act, Section 401 permit from SCDHEC, and a Section 404 permit from the USACE. No work in Waters of the United States will occur until after issuance of the regulatory authorizations.	Reduce impacts associated with the discharge of dredge or fill into wetlands and other Waters of the United States
Biological Resources	Vegetation Clearing: Vegetation clearing will be conducted outside of SCDNR windows for migratory birds to the extent practicable. If not possible, the Navy will conduct pre-construction nesting bird surveys by a qualified biologist.	Reduce the potential impact to migratory birds
	Forest Clearing: The required 50-foot clear zone would require tree clearing. DoD policy requires monetary payment for all commercially valuable timber on military installations be made to the service branch's Forestry Office. The base Forester will survey the standing timber and make a value determination that will be included in contract specifications.	Payment to the Forestry Office for the value of trees cleared would support reforestation efforts, maintenance and replacement of forestry equipment and vehicles, and forest access road improvements
	Invasive Species and Herbicide Use: Implementation of the base's Integrated Pest Management Plan during construction, operation, and maintenance. The plan contains methods for conducting safe, effective, and environmentally sound pest management. Only authorized herbicides including those with rapid degradation in water and low toxicity would be used and their use would be in accordance with the label and IPMP.	Reduce potential for invasive species to establish themselves and reduce impacts on wetland areas and streams during maintenance associated with herbicide use

Table 2-3 Best Management Practices

<i>Resource</i>	<i>BMP Description</i>	<i>Impacts Reduced/Avoided</i>
Soils	As a condition of the NPDES permit for construction, the contractor would implement measures included in the SWPPP for erosion and sediment controls and stormwater BMPs. Navy would require its contractor to use BMPs during construction.	Reduce erosion, sedimentation, and stormwater pollution during construction Reduce impacts on hydric and low revegetation potential soils and to reduce compaction
Cultural Resources	During any soil-disturbing activities, if prehistoric or historic artifacts, human remains, buried features, or structural foundations are discovered, the contractor will be directed to stop work and contact the Cultural Resources/NEPA Manager immediately.	Reduce potential impacts on any unknown and undisturbed prehistoric or historic artifacts, human remains, buried features, or structural foundations
Infrastructure	Alternative 2: Signs would need to be posted regarding low water crossings during rain events. Other security features may be required, such as raising the fence height. Alternative 3: A waiver would be required for the less than 50-foot clear zone. Alternative security measures would be required. Alternative 4: Alternative security measures would need to be implemented for the student parking area. These measures would include assigning security staff, along with providing guard shacks.	Reduce potential for unsafe conditions
Air Quality	Dust emissions from ground disturbance and road traffic could be controlled by spraying water on soil piles and graded areas and keeping roadways clean.	Generation of temporary air emissions associated with construction equipment and dust
Noise	Limit construction to daytime hours.	Temporary construction noise generated during times when noise sensitivity would be lower

Key: BMP = best management practice; NPDES = National Pollutant Discharge Elimination System; SCDHEC = South Carolina Department of Health and Environmental Control; SCDNR = South Carolina Department of Natural Resources; SWPPP = Storm Water Pollution Prevention Plan; USACE = U.S. Army Corps of Engineers

This page intentionally left blank.

3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and an analysis of the potential direct and indirect effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this Environmental Assessment (EA). In compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality, and Department of Navy guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

“Significantly,” as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would need to be in order to be considered significant.

This section includes analysis of water resources, biological resources, land use, geological resources, cultural resources, infrastructure, air quality, noise, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice.

The potential impacts to the following resource areas are considered to be negligible or non-existent so they were not analyzed in detail in this EA:

Visual Resources: The existing visual quality and viewer sensitivity of the proposed project area define the potential impact on visual resources. Although there would be forest clearing and a resulting change in visual resources, viewer sensitivity would be low. The closest residents live in military housing, located 0.17 mile from the nearest clear zone fence area. The closest off-base resident is located approximately 1.8 miles to the west. The Marrington Elementary School is located 0.13 mile from the closest location of the fence and patrol road and Marrington Middle School of the Arts is located 0.08 mile from the closest location of the fence and patrol road. For both residences and the schools, a fence is not unusual around a military facility and would benefit public health and safety. Therefore, visual resources were not analyzed further.

Transportation: Construction of the fence and patrol road would not change the number of permanent employees at the Naval Nuclear Power Training Command (NNPTC) or Naval Health Clinic Charleston (NHCC). Some temporary increases in traffic could occur during construction from workers and heavy vehicle equipment. Construction would be short-term (six months to one year) and would affect different areas as the fence and patrol road are constructed. In addition, construction equipment would remain on-site until the project is complete and heavy equipment would be moved during off-peak hours when possible. Therefore, this resource was not analyzed further.

3.1 Water Resources

This discussion of water resources includes groundwater, surface water, wetlands, and floodplains. Marine waters and shorelines would not be impacted by the Proposed Action and, therefore, are not addressed in this EA. This section also discusses the physical characteristics of surface waters, wetlands, etc.; wildlife and vegetation are addressed in Section 3.2 (Biological Resources).

Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells. Groundwater is used for water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition. Sole source aquifer designation provides limited protection of groundwater resources that serve as drinking water supplies.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are jointly defined by the United States (U.S.) Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include “swamps, marshes, bogs and similar areas.”

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation, that is, the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency and provide a basis for comparing the locale of the Proposed Action to the floodplains.

3.1.1 Regulatory Setting

The Safe Drinking Water Act is the federal law that protects public drinking water supplies throughout the nation. Under the Safe Drinking Water Act, USEPA sets standards for drinking water quality. Groundwater quality and quantity are regulated under several statutes and regulations, including the Safe Drinking Water Act.

The Clean Water Act (CWA) establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) and nonpoint sources (i.e., stormwater) of water pollution.

The South Carolina NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES Construction General Permit for stormwater discharges. Construction that necessitates an individual

permit also requires preparation of a Notice of Intent to discharge stormwater and a Storm Water Pollution Prevention Plan (SWPPP) that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are currently regulated by USACE under Section 404 of the CWA as a subset of all “Waters of the United States.” Waters of the United States are defined as:

- (1) traditional navigable waters,
- (2) wetlands adjacent to navigable waters,
- (3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically three months), and
- (4) wetlands that directly abut such tributaries under Section 404 of the CWA, as amended, and are regulated by USEPA and USACE.

The CWA requires that South Carolina establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads for the sources causing the impairment.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other Waters of the United States. Any discharge of dredge or fill into Waters of the United States requires a permit from USACE.

Section 438 of the Energy Independence and Security Act establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 square feet must “maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.”

Section 10 of the Rivers and Harbors Act provides for USACE permit requirements for any in-water construction. USACE and some states require a permit for any in-water construction. Permits are required for construction of piers, wharfs, bulkheads, pilings, marinas, docks, ramps, floats, moorings, and like structures; construction of wires and cables over the water, and pipes, cables, or tunnels under the water; dredging and excavation; any obstruction or alteration of navigable waters; depositing fill and dredged material; filling of wetlands adjacent or contiguous to Waters of the United States; construction of riprap, revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters.

The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

The Coastal Zone Management Act of 1972 (CZMA) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Actions

occurring within the coastal zone commonly have several resource areas that may be relevant to the CZMA. The CZMA regulatory setting discussion is included in Section 3.3.1 (Land Use).

Executive Order (EO) 11990, *Protection of Wetlands*, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

EO 11988, *Floodplain Management*, requires federal agencies to avoid, to the extent possible, long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a 1 percent chance of inundation by a flood event in a given year.

EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amends EO 11988 and establishes the Federal Flood Risk Management Standard to improve the nation's resilience to current and future flood risks, which are anticipated to increase over time due to the effects of climate change and other threats.

3.1.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water quality resources at Joint Base Charleston – Weapons Station (JB CHS-WS).

Groundwater

JB CHS-WS and the surrounding area are underlain by six major aquifer systems in the South Carolina Coastal Plain: Middendorf, Black Creek, Pee Dee, Black Mingo, Tertiary Limestone, and surficial aquifer systems. The top of the Middendorf Aquifer ranges in depth from 300 to 700 feet below land surface. There is little data available for groundwater yields from this system in the northwest region of the county. However, a few wells near the town of North are screened in the Black Mingo and Pee Dee aquifer systems and withdraw a mixture of water from both (U.S. Air Force, 2015).

Potable water for JB CHS-WS is provided by the North Charleston Public Services Authority. JB CHS-WS does not operate public supply wells.

Surface Water

JB CHS-WS lies in the Cooper River watershed approximately 16 river miles from the ocean. It is bounded on the southeast by the Cooper River and on the northeast by the Back River reservoir. It is bisected by two major creeks: Foster Creek to the north and Goose Creek to the south (Figure 3-1, Water Resources at JB CHS-WS). Foster Creek empties into Back River. Back River and Goose Creek empty into the Cooper River. The mean tidal range of the Cooper River is 5.2 feet; normal tides vary from a minimum low of 1.1 feet to a maximum of 6.3 feet. Back River and Foster Creek have reduced tidal ranges because there is a dam across the Back River. However, the Cooper and Back Rivers are connected by Durham Creek, north of the base, which allows tidal exchange on the Back River. These major rivers and creeks are flanked by expanses of marshland and freshwater wetlands. Fingers of these marshes extend into the uplands along drainage ways. There are 17 freshwater ponds on JB CHS-WS totaling 226 acres (U.S. Air Force, 2015). According to the South Carolina Department of Health and

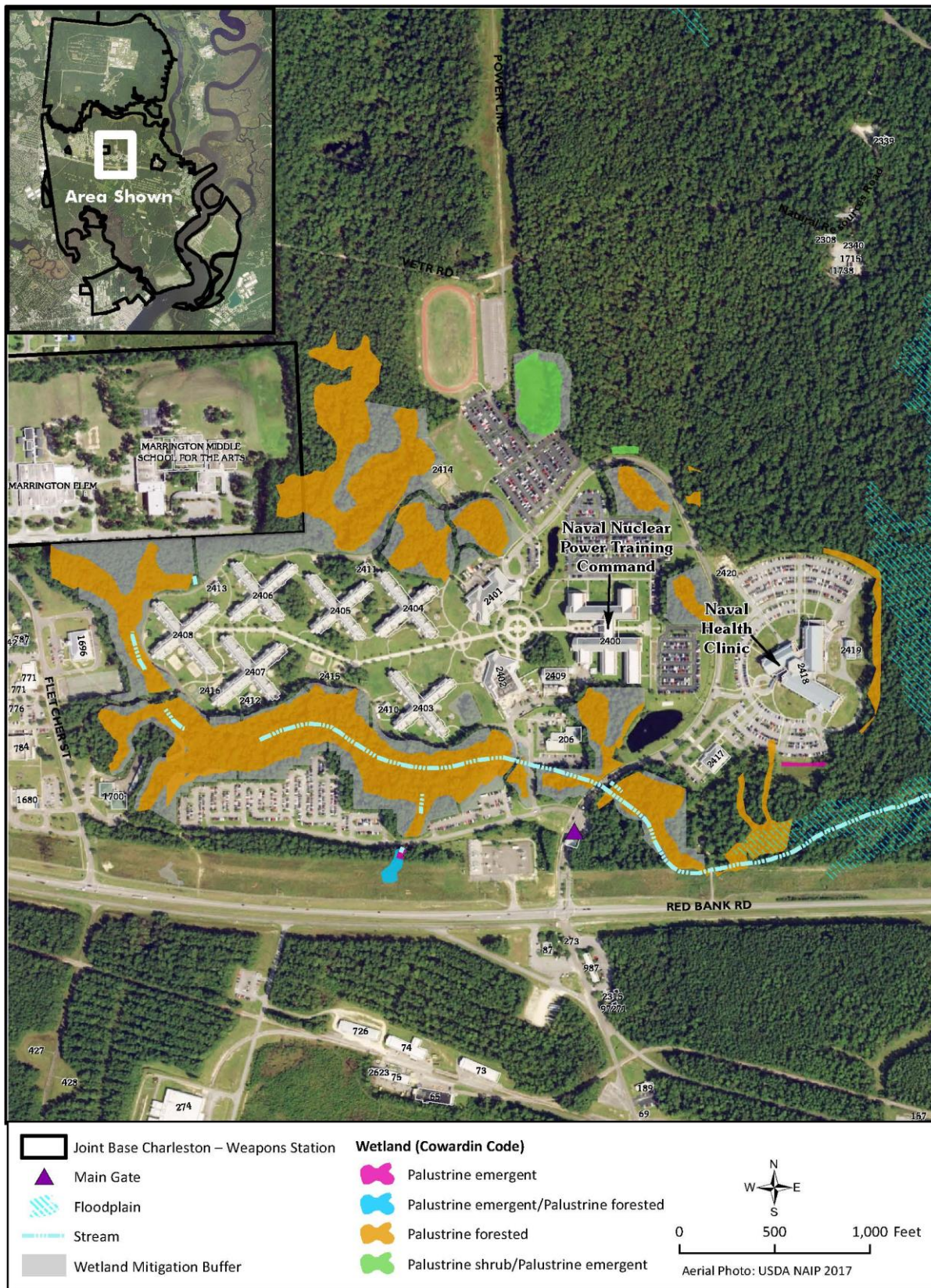


Figure 3-1 Water Resources at JB CHS-WS

Environmental Control (SCDHEC), the Cooper River is impaired due to dissolved oxygen, mercury, and bacteria while the Back River reservoir is considered a Water of Concern due to the level of total recoverable metals (SCDHEC, 2019).

Surface water features include several drainages and an unnamed intermittent stream that flows in a west to east direction. The unnamed stream connects to the Back River, which flows to the Cooper River. Other surface water features include ponds and stormwater retention basins (Figure 3-1).

Table 3-1 presents the major waterbodies within the vicinity of the project area.

Table 3-1 Waterbodies within the Vicinity of the Project Area

<i>Waterbody</i>	<i>Type</i>	<i>Designated Use</i>	<i>Water Quality Classification</i>
Cooper River	Perennial	Fish consumption	Impaired (no TMDL) – DO, Hg, bacteria
Back River	Perennial	Aquatic life	Water of Concern – Pb
Foster Creek	Perennial	Aquatic life	Impaired (no TMDL) – DO
Goose Creek	Perennial	Recreational (contact)	Impaired (no TMDL) – bacteria
Durham Creek	Perennial	Fish Consumption	Impaired (no TMDL) – Hg (fish)
S-1 (unnamed)	Intermittent	NA	NA
S-3 (unnamed)	Intermittent, constructed drainage	NA	NA

Key: DO = dissolved oxygen; Hg = mercury; NA = not applicable; Pb = lead; TMDL = total maximum daily load

Source: (SCDHEC, 2019; U.S. Air Force, 2015)

Wetlands

The coastal location of JB CHS-WS results in the presence of salt, brackish, and freshwater marshes and wetlands. Wetland and aquatic habitat types include forested wetlands, non-forested wetlands, and open water. These habitats range from large expanses of tidal salt marsh to small isolated forested wetlands. Open water habitats range from small freshwater ponds to the estuarine waters of the Cooper River (U.S. Air Force, 2015).

Base-wide wetland surveys for JB CHS-WS were conducted prior to the 2003 Integrated Natural Resources Management Plan (INRMP), where approximately 1,356 acres of tidal wetland and 1,664 acres of freshwater wetland were identified (U.S. Air Force, 2015). According to the National Wetland Inventory (NWI) classification system (Cowardin et al., 1979), wetland habitats at the base are classified into four major categories:

- Estuarine – deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land (either open, partly obstructed, or sporadic) to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from land. Estuarine communities at JB CHS-WS include salt marsh and brackish marsh.
- Palustrine – includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand. It also includes small, shallow, permanent or intermittent ponds. Palustrine wetlands at JB CHS-WS are dominated by two cover types: forested and emergent. Small areas of scrub/shrub, aquatic bed, and unconsolidated bottom (open water) types are also present.

- Lacustrine – lacustrine wetlands are permanently flooded ponds or lakes larger than 20 acres. This habitat is represented by Big David, Little David, and Hooker Lake.
- Riverine – the riverine ecosystem includes all freshwater wetland and deepwater habitats contained within a channel (except wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens). This system is represented by Back River, Foster Creek, Goose Creek, and that section of the Cooper River not influenced by estuarine waters.

The base conducted a wetland delineation and subsequent designation of protected areas for the construction of the NNPTC center in 1996. A Nationwide permit was issued and as part of this permit, protected areas consisting of 20 acres of wetlands and adjacent uplands were to be preserved and enhanced (called protected areas) (Navy, 1996). In February 2019, the base conducted wetland and surface water delineations within a 100-foot corridor of the proposed fence line (Navy, 2019) (Appendix B, Clean Water Act Documentation). The clear zone is only 50-feet; however, the 100-foot corridor was delineated to allow potential wetland avoidance and flexibility for the design team. As a result, the wetland acreage within the fence corridor for USACE is larger and will be revised once a conceptual design is available and during the permit application process. A jurisdictional determination field visit by the USACE was conducted on May 15, 2019. In a preliminary discussion, the USACE indicated that they may evaluate impact of the project on protected areas and any 2019 delineation areas outside of the 1996 protected areas. Calculations of wetland impacts reflect the impact on 1996 protected areas, whether considered wetland or upland, plus the 2019 delineated wetlands located outside of the protected areas. Continuing coordination with the USACE (Charleston District) regarding the boundaries of the jurisdictional waters is currently ongoing (Navy, 2019).

National Wild and Scenic Rivers

There are no designated National Wild and Scenic Rivers Systems located within or near JB CHS-WS. The closest designated river system (Chattooga River) occurs over 200 miles away; therefore, wild and scenic rivers are not evaluated further in this document.

Coastal Zone and Marine Sources Management

JB CHS-WS is located within the Coastal Zone of the South Carolina Coastal Plain. The Coastal Zone encompasses a narrow area along the coast dominated by tidal rivers, creeks, and marshlands where development is mostly limited to the broad, flat peninsulas between tidal areas (U.S. Air Force, 2015).

Floodplains

Flooding of the marsh and low areas occurs with tidal variations at JB CHS-WS. The 100-year floodplain varies from 8.5 to 10.5 feet above mean sea level (MSL) on the installation (Figure 3-1). The 100-year floodplain at JB CHS-WS has been identified by USACE and encompasses lands along the Cooper River, Foster Creek, and Goose Creek (U.S. Air Force, 2015). The project area is not located within the 100-year floodplain at JB CHS-WS.

3.1.3 Environmental Consequences

In this EA, the analysis of water resources evaluates the potential impacts on groundwater, surface water, wetlands, and floodplains. Groundwater focuses on the potential for impacts to the quality, quantity, and accessibility of the water. Surface water considers the potential for impacts that may change the water quality, including both improvements and degradation of current water quality. Analysis of wetland areas evaluates the potential for impacts that may change the local hydrology, soils,

or vegetation that support a wetland. For floodplains, the analysis evaluates if new construction is within a floodplain or may impede the functions of floodplains in conveying floodwaters. The region of influence (ROI) for water resources includes the project area and the potentially impacted areas downstream of NNPTC. Figure 3-2 shows the four action alternatives and the project area water features.

3.1.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to baseline water resources. Therefore, no significant impacts to water resources would occur with implementation of the No Action Alternative.

3.1.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

Groundwater

Groundwater is not used as a source of potable water at JB CHS-WS; therefore, there would be no impacts to potable water. Construction of the fence posts would be spaced at 10 feet or closer and embedded into a concrete footing of 42 inches. Construction would not impact the deep aquifers but could reach the surficial aquifer. If the surficial aquifer would be encountered, the contractor would use dewatering techniques and best management practices (BMPs) to reduce impacts to groundwater. Therefore, there would be no significant impacts to groundwater would occur.

Surface Water

Impacts on hydrology may result from land-clearing, disruption of the soil profile, loss of vegetation, introduction of pollutants, creation of new impervious surfaces, and an increased rate or volume of runoff after major storm events. Generally, impacts can be avoided or minimized to a level of insignificance if proper construction techniques, erosion control measures, and structural engineering designs are incorporated.

Direct impacts to surface waters would include crossing of two jurisdictional streams (161.7 linear feet). Both streams are intermittent and located on the west side of the property near the dormitories. One stream averages 5 feet wide and 8 inches deep while the other is 5 feet wide and approximately 6 inches deep. This stream is a constructed drainage with intermittent flow that appears to be conveying stormwater runoff from areas north of the dormitories into a culvert underneath the dormitories. Fill for the patrol road and new or culvert extensions would be required, resulting in potential impacts to the two streams. Culverts or culvert extensions would maintain water flow. A Clean Water Act, Section 401 Water Quality Certification will be required from SCDHEC and a Clean Water Act, Section 404 permit (USACE permit for the discharge to waters or wetlands) will be obtained from USACE prior to any construction work in jurisdictional streams. Compensatory mitigation through the purchase of stream bank credits will be required for stream impacts. Therefore, there would be no significant impact to surface water.

Under Alternative 1, approximately 14.90 acres of land area for the 50-foot fence/clear zone would be disturbed. Of the 14.90 acres, 3.59 acres would be used for the 12-foot-wide permanent patrol road, and the remaining 11.31 acres would be maintained with vegetation no higher than 8 inches. A General Pollutant Discharge Elimination System Permit for Discharges of Stormwater from Construction Activities will be obtained prior to implementation. Permit requirements include the development and



Figure 3-2 Location of Alternatives and Water Features at JB CHS-WS

implementation of a SWPPP that will contain a stormwater management plan, sediment and erosion control plan, and BMPs. The Navy or its contractor will select, install, implement, and maintain control measures as identified in the SWPPP to minimize pollutants discharged and ensure that the discharge does not cause or contribute to an exceedance of applicable water quality standards.

Potential indirect impacts from proposed construction could result in additional sediment loads being transported to surface waters in the project vicinity. Additional sediment loads would be managed by appropriately designed conveyance structures (e.g., culverts) in accordance with site-specific engineering standards that take into consideration surface water drainage within, adjacent to, and downstream of the project. In addition, surface water runoff control measures will be incorporated into the design. These measures will help to avoid or minimize conflicts with city, county, state, or federal regulations and will prevent adverse effects to adjacent properties and/or the project area. These measures could include the use of porous materials, directing runoff to permeable areas, and use of detention basins to release runoff over time. All necessary permits, including a NPDES permit for stormwater discharges, will be obtained prior to construction. The Navy will specify compliance with the stormwater discharge permit in all of the contractor construction documents. Additionally, BMPs would be implemented to the extent practicable to satisfy the Navy Low Impact Development goal of no net increase in stormwater or nutrient loading from major construction projects. As a result of BMPs, no significant impacts to surface water features in the ROI or immediately downstream of the project area would be anticipated.

The project is approximately 1.5 miles upstream of the Back River, which is considered a Water of Concern due to the level of total recoverable metals (SCDHEC, 2019). Alternative 1 would not be expected to contribute to the impairment of the Back River due to the distance from the river and the BMPs described above to reduce the conveyance of sediment to downstream locations. The Cooper River is a mile downstream of the Back River; therefore, no impacts to the Cooper River would be anticipated.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to surface water quality. Impacts could include a temporary decrease in dissolved oxygen in the intermittent streams, if water is present at the time of application. This would be the result of plant decomposition. After the plants decompose, the oxygen levels would be expected to return to background levels. However, only authorized herbicides including those with rapid degradation in water and low toxicity would be used and their use would be in accordance with the label and IPMP. In addition, use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near streams will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to surface water features in the ROI or immediately downstream of the project area would be anticipated.

Alternative 1 would not include new industrial activities or discharges of industrial stormwater. Refer to Section 3.10 (Hazardous Materials and Wastes) for potential impacts to existing groundwater contamination at JB CHS-WS.

Wetlands

Under Alternative 1, approximately 2.97 acres of wetland areas including protected areas would be disturbed. Table 3-2 presents these impacts by the area of disturbance, wetland type, and the acreages affected.

The impervious 12-foot patrol road would represent a permanent impact to wetlands. The remaining clear zone impacts would involve cutting and maintaining vegetation to 8 inches. This would be considered a permanent impact to wetlands due to conversion of forested or scrub-shrub wetlands to emergent. JB CHS-WS has 1,664 acres of freshwater wetlands (U.S. Air Force, 2015). As a result, impact to 2.97 acres represents 0.2 percent of the freshwater wetlands at JB CHS-WS.

Table 3-2 Alternative 1 Wetland Impacts

Wetland Type	Patrol Road¹ (Acres)	Clear Zone (Acres)	Total (Acres)
1996 Protected Areas			
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.02	0.02
Palustrine Forested	0.13	0.58	0.71
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.02	0.02
Mitigation Buffer	0.23	1.61	1.84
1996 Subtotal	0.36	2.23	2.59
2019 Delineation²			
Palustrine Emergent	0.01	0.00	0.01
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.00	0.00
Palustrine Forested	0.02	0.33	0.35
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.02	0.02
2019 Subtotal³	0.02	0.36	0.38
Total	0.38	2.59	2.97

Notes:

¹ The patrol road is contained within the 50-foot clear zone.

² There is overlap between the 2019 delineation and 1996 protected areas. The 2019 delineation only reflects acreage outside of protected areas.

³ For this EA, a 50-foot corridor was analyzed. The Wetland Delineation Report for the USACE evaluated a 100-foot corridor to provide potential wetland avoidance opportunities and design flexibility.

Every effort will be taken during the design phase to avoid, to the maximum extent practicable, adverse impacts to wetlands. However, all wetlands cannot be avoided and Clean Water Act, Sections 401/404 permitting will be obtained and the required compliance with USACE Mitigation Guidelines will be implemented. To offset wetland impacts, the Navy will purchase the appropriate wetland credits from existing, local banks and prepare a Mitigation Plan detailing components, execution strategy, organizational responsibilities, and schedule as part of the permitting process. Therefore, there would be no significant impact to wetlands.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to wetlands. Impacts could include a temporary decrease in dissolved oxygen due to plant decomposition and alteration of wetland nutrient cycles. After the plants decompose, the oxygen levels would be expected to return to background levels. Wetland nutrient cycles would also be expected to return to normal cycles once application would be completed. However, only authorized herbicides including those with rapid degradation in water and low toxicity would be used and their use would be in accordance with the label and IPMP. In addition, use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near wetland areas will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to wetlands in the ROI or immediately downstream of the project area would be anticipated.

Coastal Zone and Marine Sources Management

Coastal Zone Consistency Review is discussed in Section 3.3 (Land Use) and correspondence to the SCDHEC's Office of Ocean and Coastal Resource Management is provided in Appendix F.

Floodplains

Because no floodplains occur within the project area, no impacts to floodplains would result from implementation of Alternative 1.

3.1.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for the analysis of effects to water resources associated with Alternative 2 is the same as Alternative 1. Alternative 2 includes the same fence and clear zone alignment as under Alternative 1, but the patrol road would be constructed with low water crossings across stream and wetland areas. As a result, there would be no new culverts or culvert extensions and the patrol road would not be elevated with fill. Wetland and stream hydrology would be maintained but the patrol road could not be used during rain or storm events due to high water levels. Signs would need to be posted to prevent a safety hazard. Alternative methods of patrol would be required during these weather events.

Groundwater

Impacts to groundwater under Alternative 2 would be similar to those described under Alternative 1.

Surface Water

Under Alternative 2, impacts to surface water would be slightly reduced compared to Alternative 1 since the same two streams would be impacted. However, stream crossings for the patrol road would be constructed using low water crossings to maintain the existing hydrology. No elevated patrol road requiring fill and additional culverts would be required. Wetland and stream hydrology would be maintained but the patrol road could not be used during rain or storm events due to high water levels. A Clean Water Act, Section 401 Water Quality Certification will be obtained from SCDHEC and a Clean Water Act, Section 404 wetland permit will be required from USACE prior to any construction work in jurisdictional streams. Compensatory mitigation through the purchase of stream bank credits will be required for stream impacts. Therefore, there would be no significant impact to wetlands.

The Navy or its contractor would select, install, implement, and maintain control measures as identified in the SWPPP to minimize pollutants discharged and ensure that the discharge does not cause or contribute to an exceedance of applicable water quality standards.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to surface water quality. Impacts could include a temporary decrease in dissolved oxygen in the intermittent streams, if water is present at the time of application. This would be the result of plant decomposition. After the plants decompose, the oxygen levels would be expected to return to background levels. However, only authorized herbicides including those with rapid degradation in water and low toxicity would be used and their use would be in accordance with the label and IPMP. In addition, use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near wetland and streams will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to surface water features in the ROI or immediately downstream of the project area would be anticipated.

Alternative 2 would not include new industrial activities or discharges of industrial stormwater. Refer to Section 3.10 (Hazardous Materials and Wastes) for potential impacts to existing groundwater contamination at JB CHS-WS.

Wetlands

Implementation of Alternative 2 would result in similar but slightly less impacts to wetland resources as those described under Alternative 1 because it would require less depth of fill in wetland areas and no new culverts or extensions. Similar to Alternative 1, impacts would consist of a permanent impact to wetlands.

Under Alternative 2, Clean Water Act, Sections 401/404 permits will be required from SCDHEC and USACE prior to any construction work in wetlands and streams. JB CHS-WS has 1,664 acres of freshwater wetlands (U.S. Air Force, 2015). As a result, impacts to less than 2.97 acres represents 0.2 percent of the freshwater wetlands at JB CHS-WS.

All wetland and stream areas cannot be avoided; therefore, permitting will be obtained and the required compliance with USACE Mitigation Guidelines will be implemented. To offset wetland impacts, the Navy will purchase the appropriate wetland credits from existing, local banks and prepare a Mitigation Plan detailing components, execution strategy, organizational responsibilities, and schedule as part of the permitting process. Therefore, there would be no significant impact to wetlands.

Coastal Zone and Marine Sources Management

Coastal Zone Consistency Review is discussed in Section 3.3 (Land Use) and correspondence to the SCDHEC's Office of Ocean and Coastal Resource Management is provided in Appendix F.

Floodplains

Because no floodplains occur within the Proposed Action area, no impacts to floodplains would result from implementation of Alternative 2.

3.1.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for the analysis of effects to water resources associated with Alternative 3 is similar to Alternative 1. Alternative 3 includes fence and clear zone alignment, but the patrol road would not be continuous.

Groundwater

Impacts to groundwater under Alternative 3 would be similar to those described under Alternative 1.

Surface Water

Direct impacts to surface waters would include crossing of the same two jurisdictional streams (65.5 linear feet). However, the patrol road would not traverse the streams and the clear zone would narrow to 20 feet. Therefore, less linear feet of streams would be impacted. A Clean Water Act, Section 401 Water Quality Certification will be required from SCDHEC and a Clean Water Act, Section 404 permit (USACE permit for the discharge to waters or wetlands) will be obtained from USACE prior to any construction work in jurisdictional streams. Compensatory mitigation through the purchase of stream bank credits will be required for stream impacts. Therefore, there would be no significant impact to surface water.

Under Alternative 3, approximately 8.74 acres of land area for the fence/clear zone would be disturbed. The patrol road would only be 0.71 mile and not continuous. The clear zone would narrow to 20 feet when crossing the two streams. Similar to Alternative 1, a NPDES General Pollutant Discharge Elimination System Permit for Discharges of Stormwater from Construction Activities will be obtained prior to implementation. Permit requirements include the development and implementation of a SWPPP including a Notice of Intent, a stormwater management plan, erosion and sediment control plan, and BMPs. The Navy or its contractor will select, install, implement, and maintain control measures as identified in the SWPPP to minimize pollutants discharged and ensure that the discharge does not cause or contribute to an exceedance of applicable water quality standards.

Alternative 3 would not include new industrial activities or discharges of industrial stormwater. Refer to Section 3.10 (Hazardous Materials and Wastes) for potential impacts to existing groundwater contamination at JB CHS-WS.

The patrol road would not cross surface water features; however, the fence would still be aligned across the two streams. As a result, the impact of Alternative 3 on surface water would be slightly less than Alternative 1 but would require an Antiterrorism Force Protection waiver and additional security measures. Potential indirect impacts from proposed construction activities would be the same as those described for Alternative 1.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to surface water quality. Impacts would be less than under Alternative 1 since the patrol road would not be continuous and the clear zone would narrow in wetland and stream areas. In addition, use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near streams will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to surface water features in the ROI or immediately downstream of the project area would be anticipated.

Wetlands

Under Alternative 3, approximately 1.37 acres of wetlands would be disturbed. Table 3-3 presents these impacts by the area of disturbance, wetland type, and the acreages affected.

The clear zone would narrow to 20 feet when crossing wetlands. However, the fence would still cross the wetland areas. The remaining clear zone impacts would involve cutting and maintaining vegetation to 8 inches. JB CHS-WS has 1,664 acres of freshwater wetlands (U.S. Air Force, 2015). As a result, impact to 1.37 acres represents 0.08 percent of the freshwater wetlands at JB CHS-WS.

Under Alternative 3, a Clean Water Act Section 401 Water Quality Certification will be required from SCDHEC and wetland permits will be required from USACE prior to any construction work in the wetland areas. Compensatory mitigation through the purchase of wetland mitigation bank credits will be required for any unavoidable wetland impacts (Section 3.13, Summary of Potential Impacts to Resources and Impact Avoidance and Minimization). Therefore, there would be no significant impact to wetlands.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to surface water quality. Impacts would be less than under Alternative 1 since the patrol road would not be continuous and the clear zone would narrow in wetland areas. In addition, use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near streams will be implemented by the Navy or

its contractors. Therefore, no significant operational impacts to wetlands in the ROI or immediately downstream of the project area would be anticipated.

Table 3-3 Alternative 3 Wetland Impacts

<i>Wetland Type</i>	<i>Patrol Road¹ (Acres)</i>	<i>Clear Zone (Acres)</i>	<i>Total (Acres)</i>
1996 Protected Areas			
Palustrine Emergent	0.00	0.01	0.01
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.01	0.01
Palustrine Forested	0.00	0.27	0.27
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.01	0.01
Mitigation Buffer	0.00	0.92	0.92
Subtotal	0.00	1.22	1.22
2019 Delineation²			
Palustrine Emergent	0.00	0.01	0.01
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.00	0.00
Palustrine Forested	0.00	0.13	0.13
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.01	0.01
2019 Subtotal³	0.00	0.15	0.15
Total	0.00	1.37	1.37

Notes:

¹ The patrol road is contained within the 50-foot clear zone.

² There is overlap between the 2019 delineation and 1996 protected areas. The 2019 delineation only reflects acreage outside of protected areas.

³ For this EA, a 50-foot corridor was analyzed. The Wetland Delineation Report for the USACE evaluated a 100-foot corridor to provide potential wetland avoidance opportunities and design flexibility.

Coastal Zone and Marine Sources Management

Coastal Zone Consistency Review is discussed in Section 3.3 (Land Use) and correspondence to the SCDHEC's Office of Ocean and Coastal Resource Management is provided in Appendix F.

Floodplains

Because no floodplains occur within the Proposed Action area, no impacts to floodplains would result from implementation of Alternative 3.

3.1.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for the analysis of effects to water resources associated with Alternative 4 is similar to Alternative 1 except the student parking area would not be enclosed.

Groundwater

Impacts to groundwater under Alternative 4 would be similar to those described under Alternative 1.

Surface Water

Direct impacts to surface waters would include crossing of two jurisdictional streams (183.5 linear feet). The two streams are intermittent and located on the west side of the property near the dormitories. One stream averages 5 feet wide and 8 inches deep while the other is 5 feet wide and approximately 6 inches deep. This stream is a constructed drainage with intermittent flow that appears to be conveying

stormwater runoff from areas north of the dormitories into a culvert underneath the dormitories. Fill for the patrol road and new or culvert extensions would be required, resulting in potential impacts to the two streams. Culverts or culvert extensions would maintain water flow. A Clean Water Act, Section 401 Water Quality Certification will be required from SCDHEC and a Clean Water Act, Section 404 permit (USACE permit for the discharge to waters or wetlands) will be obtained from USACE prior to any construction work in jurisdictional streams. Compensatory mitigation through the purchase of stream bank credits will be required for stream impacts. Therefore, there would be no significant impact to surface water.

Under Alternative 4, approximately 15.71 acres of land area for the fence/clear zone would be disturbed. Of the 15.71 acres, 4.06 acres would be used for the 12-foot-wide permanent patrol road and access road. The remaining 11.65 acres would be maintained with vegetation no higher than 8 inches.

Similar to Alternative 1, a NPDES General Pollutant Discharge Elimination System Permit for Discharges of Stormwater from Construction Activities would be obtained prior to implementation. Permit requirements include the development and implementation of a SWPPP including a Notice of Intent, a stormwater management plan, erosion and sediment control plan, and BMPs. The Navy or its contractor will select, install, implement, and maintain control measures as identified in the SWPPP to minimize pollutants discharged and ensure that the discharge does not cause or contribute to an exceedance of applicable water quality standards.

Alternative 4 would not include new industrial activities or discharges of industrial stormwater. Refer to Section 3.10 (Hazardous Materials and Wastes) for potential impacts to existing groundwater contamination at JB CHS-WS.

Direct impacts to surface waters would include the two stream crossings described for Alternative 1. A Clean Water Act, Section 401 Water Quality Certification would be required by SCDHEC and a Clean Water Act, Section 404 wetland permit will be required from USACE prior to any construction work in jurisdictional streams. Compensatory mitigation through the purchase of stream bank credits will be required for any unavoidable impacts. Potential indirect impacts from proposed construction activities would be larger than those described for Alternative 1 since the fence line is longer.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to surface water quality. Impacts would be greater than under Alternative 1 since the fence and clear zone would be longer under Alternative 4. Use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near streams will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to surface water features in the ROI or immediately downstream of the project area would be anticipated.

Wetlands

Under Alternative 4, approximately 4.78 acres of wetlands and protected areas would be disturbed. This is the greatest amount of wetland impacts of the alternatives considered. Table 3-4 presents these impacts by the area of disturbance, wetland type, and the acreages affected.

Under Alternative 4, a Clean Water Act, Section 404 wetland permit would be required from USACE prior to any construction work in wetland areas. Compensatory mitigation through the purchase of wetland mitigation banks will be required for any unavoidable wetland impacts (Section 3.13, Summary

of Potential Impacts to Resources and Impact Avoidance and Minimization). Therefore, there would be no significant impact to wetlands.

Table 3-4 Alternative 4 Wetland Impacts

<i>Wetland Type</i>	<i>Patrol Road¹</i>	<i>Clear Zone</i>	<i>Total Acres</i>
1996 Protected Areas			
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.00	0.00
Palustrine Forested	0.29	0.93	1.22
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.02	0.02
1996 Wetland Mitigation Buffer area	0.56	2.61	3.17
Subtotal	0.85	3.56	4.41
2019 Delineation²			
Palustrine Emergent	0.00	0.00	0.00
Mixture of Palustrine Emergent and Palustrine Forested	0.00	0.00	0.00
Palustrine Forested	0.02	0.33	0.35
Mixture of Palustrine Emergent and Scrub-Shrub	0.00	0.02	0.02
2019 Subtotal³	0.02	0.35	0.37
Total	0.87	3.91	4.78

Notes:

¹ The patrol road is contained within the 50-foot clear zone.

² There is overlap between the 2019 delineation and 1996 protected areas. The 2019 delineation only reflects acreage outside of protected areas.

³ For this EA, a 50-foot corridor was analyzed. The Wetland Delineation Report for the USACE evaluated a 100-foot corridor to provide potential wetland avoidance opportunities and design flexibility.

During operation, use of herbicides to control vegetation annually and periodic spot applications could pose potential impacts to wetlands. Impacts would be greater than under Alternative 1 since the fence and clear zone would be longer under Alternative 4 and traverse more wetland areas. Use of BMPs such as maintaining equipment in good working condition and preventing refueling gas-powered mowers and vegetation pruning tools in or near streams will be implemented by the Navy or its contractors. Therefore, no significant operational impacts to wetland areas in the ROI or immediately downstream of the project area would be anticipated.

Coastal Zone and Marine Sources Management

Coastal Zone Consistency Review is discussed in Section 3.3 (Land Use) and correspondence to the SCDHEC's Office of Ocean and Coastal Resource Management is provided in Appendix F.

Floodplains

Because no floodplains occur within the Proposed Action area, no impacts to floodplains would result from implementation of Alternative 4.

3.2 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support plants or animals.

Within this EA, biological resources are divided into two major categories: (1) terrestrial vegetation and (2) terrestrial wildlife. Marine vegetation and wildlife would not be impacted by the Proposed Action and, therefore, are not addressed in this EA.

3.2.1 Regulatory Setting

Special-status species, for the purposes of this assessment, are those species listed as threatened or endangered under the Endangered Species Act (ESA) and species afforded federal protection under the Migratory Bird Treaty Act (MBTA).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration Fisheries to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species, or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the Department of Defense (DoD) where an INRMP has been developed that, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation.

Birds, both migratory and most native-resident bird species, are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (*Migratory Bird Conservation*). Under the MBTA, it is unlawful by any means or in any manner, to take migratory birds or their nests or eggs at any time, unless permitted by regulation. Take is defined as a means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect (50 CFR 10.12). The 2003 National Defense Authorization Act gave the Secretary of the Interior authority to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during authorized military readiness activities. The final rule authorizing the DoD to take migratory birds in such cases includes a requirement that the Armed Forces must confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species.

Birds of Conservation Concern (BCC) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCC have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCC have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008).

Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act. This Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”

The Magnuson-Stevens Fishery Conservation and Management Act provides for the conservation and management of the fisheries. Under the Act, essential fish habitat (EFH) consists of the waters and substrate needed by fish to spawn, breed, feed, or grow to maturity.

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for biological resources at JB CHS-WS. Threatened and endangered species are discussed in each respective section below with a composite list applicable to the Proposed Action provided in Table 3-5.

Table 3-5 Threatened and Endangered Species Known to Occur or Potentially Occurring in the Region of Influence (ROI) and Critical Habitat Present in ROI

<i>Common Name</i>	<i>Scientific Name</i>	<i>Federal Listing Status</i>	<i>State Listing Status</i>	<i>Critical Habitat Present?</i>
Mammals				
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	FT	S1	No
West Indian Manatee	<i>Trichechus manatus</i>	FT	SE, S1, S2	No
Birds				
Red-cockaded Woodpecker	<i>Picoides borealis</i>	FE	SE, S2	No
Wood Stork	<i>Mycteria americana</i>	FT	SE, S1, S2	No
Amphibians				
Frosted Flatwoods Salamander	<i>Ambystoma cingulatum</i>	FT	SE, S1	No
Flowering Plants				
American Chaffseed	<i>Schwalbea americana</i>	FE	S2	No
Canby's Dropwort	<i>Oxypolis canbyi</i>	FE	S2	No
Pondberry	<i>Lindera melissifolia</i>	FE	S2	No

Sources: (SCDNR, 2015a; SCDNR, 2015b; SCDNR, 2015c; USFWS, 2019)

Key: FE = federal endangered; FT = federal threatened; ROI = region of influence; SE = state endangered; S1 = state critically imperiled; S2 = state imperiled

Terrestrial Vegetation

Vegetation includes terrestrial plant as well as freshwater aquatic communities and constituent plant species. Vegetation management at JB CHS-WS is guided by the INRMP (U.S. Air Force, 2015). According to the INRMP, seven habitat types occur within JB CHS-WS. A description of these communities is provided below.

- **Uplands** – upland areas at JB CHS-WS consist of improved (urban/disturbed) and semi-improved (maintained/successional) grounds. Improved grounds are those areas that receive intensive horticultural development and maintenance. Semi-improved grounds are areas that receive less intensive development and maintenance.
- **Urban/Disturbed** – communities identified as urban/disturbed support residential, commercial, and industrial development. These communities are characterized by a variety of landscape grasses and shrubs such as sea myrtle (*Baccharis angustifolia*) and wax myrtle (*Myrica cerifera*), supplemented by native pine and hardwood trees.
- **Maintained/Successional** – maintained/successional communities occur along utility line corridors and road shoulders where periodic maintenance (mowing, disking, or burning) is performed. These systems are characterized by a number of perennial species including broomsedge (*Andropogon virginicus*), goldenrod (*Solidago* spp.), aster (*Aster* spp.), ragweed (*Ambrosia artemisiifolia*), dogfennel (*Eupatorium capillifolium*), blackberry (*Rubus* sp.), and a variety of grasses. The invasive exotic Japanese honeysuckle (*Lonicera japonica*) is also a common component of this community. On saturated or inundated sites, soft rush (*Juncus effusus*), bulrush (*Scirpus cyperinus*), common cattail (*Typha latifolia*), and other hydric species are present.

- Pine Flatwoods – prominent in the upland and better-drained areas of JB CHS-WS. Loblolly pine (*Pinus taeda*) and/or longleaf pine (*Pinus palustris*) dominate these areas with occasional pond pine (*Pinus serotina*) where seasonal inundation or saturated soils occur. In some areas, hardwood species such as sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), and willow oak (*Quercus phellos*) occasionally reach canopy height, but mostly exist as understory trees along with wax myrtle, dogwood (*Cornus florida*), and American holly (*Ilex opaca*). In areas where mesic conditions prevail, red bay (*Persea borbonia*) and sweet bay (*Magnolia virginiana*), may also be found in the forest understory. Ground cover and shrub layer vegetation are variable and dependent upon the hydrological regime and degree of canopy closure. Typical species include, swamp sweetbells (*Leucothoe racemosa*), sweet pepper bush (*Clethra alnifolia*), bracken fern (*Pteridium aquilinum*), blackberry (*Rubus* spp.), and greenbrier (*Smilax* spp.). Invasive exotic species such as Japanese honeysuckle and privet (*Ligustrum sinense*) are common in this community type.
- Pine Savannah – pine savannah communities at JB CHS-WS are characterized by scattered mature loblolly and longleaf pine that withstood Hurricane Hugo, along with grasses, ferns, and scattered saplings. Young growth of longleaf and loblolly pine seedlings are prevalent.
- Pine/Mixed Hardwood Forest – loblolly pine, sweetgum, water oak, red maple, and occasional longleaf pine typically dominate pine/mixed hardwood forests at JB CHS-WS. On slightly drier sites, scattered live oak (*Q. virginiana*), southern red oak (*Q. falcata*), blackjack oak (*Q. marilandica*), and post oak (*Q. stellata*) are present in the overstory. Understory composition is similar to older pine woodlands, and also includes holly, wax myrtle, dogwood, sweetleaf (*Symplocos tinctoria*), and young canopy saplings. Switch cane (*Arundinaria tecta*), greenbrier, the invasive exotic Japanese honeysuckle, and a variety of ferns, herbaceous species, and grasses occur sporadically throughout the herb layer.
- Wetlands – wetlands at JB CHS-WS are largely tidal and non-tidal emergent systems. Also present are wetland forest, scrub/shrub, and open water habitats. As previously discussed in Section 3.1.2 (Water Resources, Affected Environment), wetlands within the project area are comprised of Palustrine System habitat types including palustrine forested, palustrine scrub-shrub, and palustrine emergent. Dominant species within the forested wetlands included loblolly pine, sweetgum, red maple, sweet bay, southern bayberry (*Morella cerifera*), switch cane, and slender wood oats (*Chasmanthium laxum*). Dominant species within the scrub-shrub and emergent wetlands included loblolly pine, sweetgum, winged elm (*Ulmus alata*), and broomsedge (Navy, 2019).

Terrestrial Wildlife

Wildlife includes all animal species (i.e., insects and other invertebrates, freshwater fish, amphibians, reptiles, birds, and mammals) focusing on the species and habitat features of greatest importance or interest.

A large number of both game and non-game fish and wildlife species inhabit the installation due to the diversity of habitats found at JB CHS-WS. Non-game species include many different types of birds, amphibians, and reptiles. Game species include bobwhite quail (*Colinus virginianus*), raccoons (*Procyon lotor*), cottontail rabbits (*Sylvilagus floridanus*), foxes (*Vulpes vulpes*), bobcats (*Lynx rufus*), deer (*Odocoileus virginianus*), and different types of waterfowl.

JB CHS-WS lies within a transition zone between fresh and salt water. The base's numerous lakes and streams support many species of fish including sunfish (*Lepomis auritus*), bass (various species), and catfish (*Ictalurus* spp.). EFH on and in the vicinity of JB CHS-WS includes salt marsh, subtidal and intertidal mudflats, unconsolidated bottoms, and tidal creeks (U.S. Air Force, 2015).

There is no EFH located within the project area. According to the NOAA Fisheries EFH mapper, the closest EFH habitats are located approximately 0.8 miles south for a snapper grouper complex (which may include up to 20 species of sea bass and grouper [*Serranidae*]), and 1.5 miles east for bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*), spinner shark (*Carcharhinus brevipinna*), tiger shark (*Galeocerdo cuvier*), and blacktip shark (*Carcharhinus limbatus*) (SAFMC, 2019) (NOAA, 2019).

Migratory Birds

JB CHS-WS is located within the Atlantic flyway, an avian migration route used by over 500 species of birds (Audubon, 2017). According to the *USFWS Birds of Conservation Concern*, JB CHS-WS is located within the Southeastern Coastal Plain, also known as BCR 27 (USFWS, 2008). A wide variety of birds are known to use the base including populations of raptors, shore birds, wading birds, perching birds, and waterfowl. Since 2000, JB CHS-WS has been conducting surveys to inventory bird species, identify priority bird species and their habitats for future management, and establish a baseline for long-term monitoring. A full list of bird species observed at JB CHS-WS is presented in the migratory bird survey appendix within the INRMP (USFWS, 2008). In correspondence to the Navy dated February 28, 2019, the USFWS provided a list of migratory birds for the project location (Appendix C, Endangered Species Act Documentation).

Bald and Golden Eagles

In South Carolina, bald eagles (*Haliaeetus leucocephalus*) are primarily associated with coasts, rivers, and lakes, usually nesting near forested areas adjacent to large bodies of water. The breeding season occurs in the late winter and nests are usually located in the tops of tall, living trees (SCDNR, 2015a).

Bald eagles have been historically observed at JB CHS-WS. Two nests are known to occur on the north side of the installation. One nest known as the Brick Hope nest is located approximately 5,400 feet (1.02 miles) from the project area. This nest was found in 2015 and has been reported active each year, including this year. The second nest is located on a 4-acre stand of cypress trees approximately 16,600 feet (3.14 miles) from the project area. This nest has been reported active annually for decades but was reported inactive this year (Larimer, 2019).

Threatened and Endangered Species

Table 3-5 lists threatened, endangered, and special status species at JB CHS-WS. This list was assembled using the USFWS Information for Planning and Consultation application report, the South Carolina Department of Natural Resources Rare, Threatened, and Endangered Species of South Carolina – List by County, and the base INRMP.

On February 28, 2019, the USFWS provided an automated *Official Species List* via section 7 letter that identified eight threatened and endangered species protected under the ESA (16 United States Code section 1531 et seq.) that could occur or are known to occur in the project area (Appendix C) (USFWS, 2019). This list of species is presented in Table 3-5.

Of the eight federally listed species identified, only two have been historically documented at JB CHS-WS during base-wide surveys that have occurred intermittently since 1993 (U.S. Air Force, 2015). These species include the red-cockaded woodpecker (RCW) (*Picoides borealis*) and the wood stork (*Mycteria americana*). No federally listed amphibians or flowering plants were identified during recent surveys of the base in 2016 (North Wind, Inc., 2016). Additionally, no critical habitat occurs within or near the project area (USFWS, 2019). Therefore, critical habitats are not evaluated further in this document.

The following section describes the two federally listed species (red-cockaded woodpecker and wood stork) known to occur or that have potential to occur within the project area and/or may be affected by the Proposed Action. The remaining six species (northern long-eared bat [*Myotis septentrionalis*], West Indian manatee [*Trichechus manatus*], frosted flatwoods salamander [*Ambystoma cingulatum*], American chaffseed [*Schwalbea americana*], Canby's Dropwort [*Oxypolis canbyi*], and pondberry [*Lindera melissifolia*]) were excluded from further analysis as they are not known to occur or do not have potential to occur within the project area and/or would not be affected by the Proposed Action. For a full discussion of effects determinations and complete analyses for all species, please refer to the Biological Evaluation (Appendix C, Endangered Species Act Documentation).

Red-cockaded Woodpecker

The federally endangered RCW requires specific habitat conditions that include open pine stands with a minimum age of 60 years. Longleaf pine is the preferred species but RCWs will also nest in loblolly and pond pine (*P. serotina*). Preferred habitat includes open, park-like stands of mature pine with little or no midstory vegetation maintained by periodic burning. The largest populations of RCWs are found in areas where longleaf pine is prevalent. Nesting for the RCW occurs from April through June (USFWS, 2011).

Prior to DoD ownership, the area now encompassed by JB CHS-WS contained extensive RCW habitat. However, past timber harvests (prior to enactment of the ESA and implementation of timber harvest and management practices), fire exclusion, construction, and other modifications have degraded and reduced the original RCW habitat within the base boundary. In 1989, Hurricane Hugo destroyed most of the mature pine timber, degrading the remaining RCW habitat. The lack of open pine forest with 60-year-old trees and older is the primary limiting factor for RCWs on the base (U.S. Air Force, 2015).

RCW management history (including historical survey records and survey methodology) and suitable habitats at the base are described in the *Red-cockaded Woodpecker Management Plan* (RCW MP) (Navy, 2013). RCW habitat restoration and reoccupation is a goal of the base endangered species program.

JB CHS-WS currently manages 2,222 acres of timberlands in the northside area of the base designated for this purpose. The RCW MP provides management practices and protocols employed at the base, including prescribed burning practices that are an integral part of a healthy longleaf pine ecosystem. The prescribed burning regimen is outlined in the base's Wildland Fire Management Plan (U.S. Air Force, 2017). RCW Management Units and habitats at JB CHS-WS are presented in Figure 3-3.

Habitat destruction from the 1989 hurricane impacted the base's RCW population. With the possible exception of the North Rhett area, foraging habitat remains marginal at best and foraging stands have few or no relic trees suitable for cavities. This has resulted in a slow decline for the RCW population on JB CHS-WS. Historical survey reports at JB CHS-WS have documented declining numbers of RCW presence, with no reported observations as of 2010 (Navy, 2013). The current RCW MP states that the last RCW sighting, a lone male, occurred during the 2006 survey. Single male birds were also the only sightings during the 1994, 1995, and 2000 surveys. Four RCW cluster sites with a total of 31 trees were located on JB CHS-WS during the 2000 survey. Only two of the four cluster sites contained an active cavity and/or start hole (Navy, 2013). Surveys conducted in June 2015 and March 2016 focused on the four known clusters. Neither RCW nor signs of cavity activity were identified during this survey effort (North Wind, Inc., 2016).

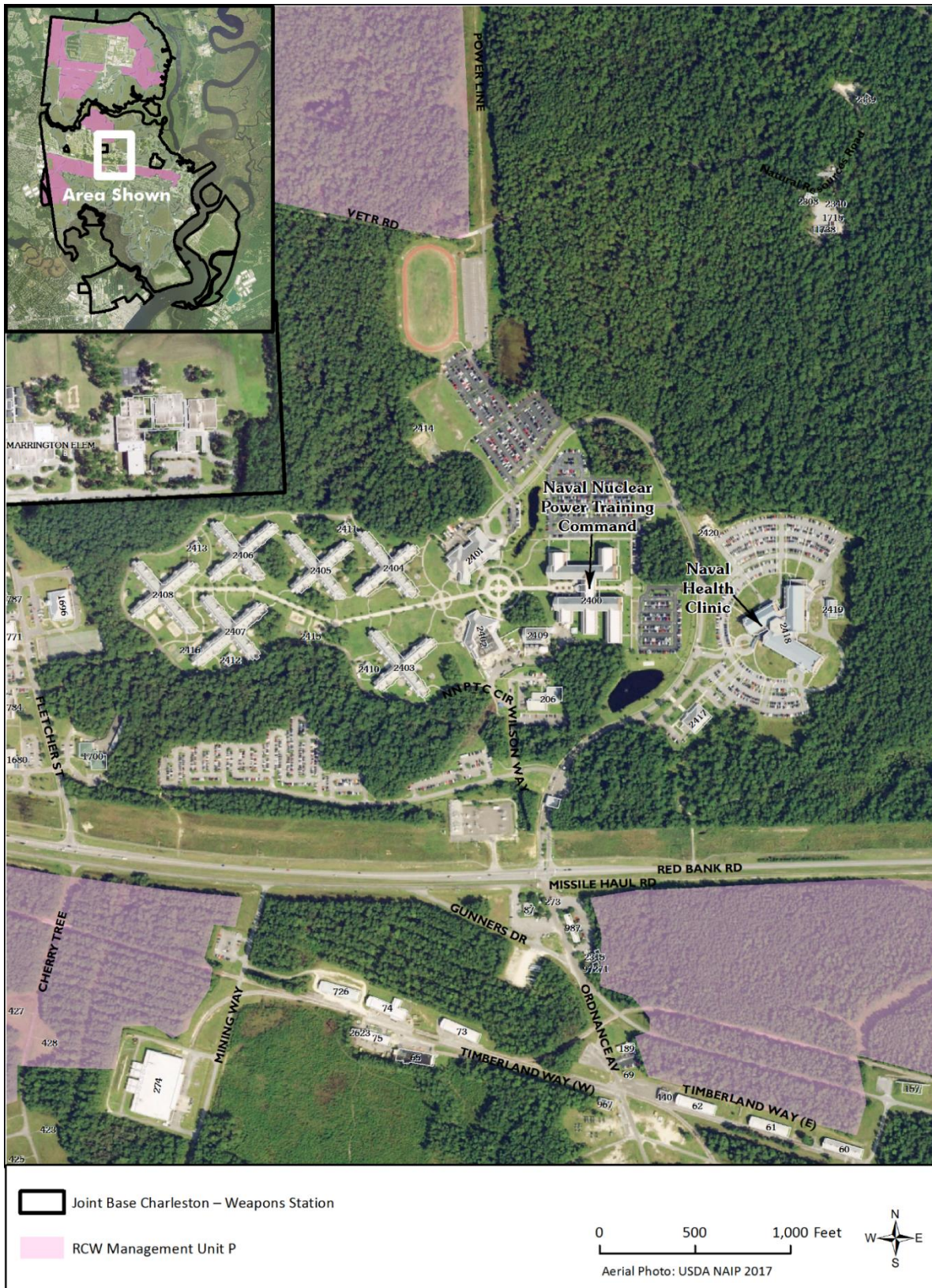


Figure 3-3 Red-cockaded Woodpecker Management Units and Habitats

Wood Stork

Habitat for the federally threatened wood stork includes freshwater and estuarine wetlands. Nesting occurs primarily in cypress or mangrove swamps. Wood storks feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Attractive feeding sites include depressions in marshes or swamps where fish become concentrated during periods of falling water levels (USFWS, 2005). Historical nesting areas were confined to Florida. However, in recent years, the birds have expanded nesting activity to several southeastern states. South Carolina's nesting populations are increasing, and the potential for wood storks to move into marsh habitats is possible.

The wood stork has been documented as a regular visitor or possible resident at JB CHS-WS. Observations of the wood stork at the base include frequent flyovers and regular feedings within shallow ponds and marshes (U.S. Air Force, 2015).

3.2.3 Environmental Consequences

This analysis focuses on wildlife or vegetation types that are important to the function of the ecosystem or are protected under federal or state law or statute. The ROI for biological resources includes the project area and adjacent waters and open and forested areas that support wildlife.

3.2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to biological resources. Therefore, no significant impacts to biological resources would occur with implementation of the No Action Alternative.

3.2.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area for the analysis of effects to biological resources associated with the Preferred Alternative includes resources found on JB CHS-WS.

Vegetation

Construction and land clearing under Alternative 1 would disturb approximately 9.01 acres of forest stand and 2.97 acres of wetland areas. Impacts to the types of vegetation present would not be considered significant because similar vegetation is available nearby. There are an estimated 8,915 acres of forested area at JB CHS-WS (U.S. Air Force, 2015). Alternative 1 would remove one-tenth of 1 percent (0.10 percent) of this habitat within the base boundaries. Additionally, construction and land clearing within improved and semi-improved grounds, which include developed areas and open space, would not be considered significant as these areas have been previously disturbed. Invasive species may become established in the disturbed areas; however, the procedures contained within the base *Integrated Pest Management Plan* would be employed to address invasive species and use of herbicides for annual vegetation maintenance in accordance with all applicable regulations. As a result, no significant impacts to vegetation from Alternative 1 would be expected.

Terrestrial Wildlife

Construction and land clearing would result in direct impacts on individuals and removal of vegetation and wildlife habitat. Direct impacts would include habitat disturbance resulting in loss or modification of habitat for terrestrial wildlife species. Construction vehicles, equipment, and personnel could also directly affect individuals, which could lead to injury or mortality. Larger wildlife species would avoid the

construction area. However, some small, less mobile species could be impacted. Construction using heavy equipment would disturb soils and plants and land clearing could permanently alter habitat for wildlife species, if present. Conservation measures, including pre-construction surveys, as needed, identifying impact-minimizing access routes, and implementing soil stabilization and restoration techniques would help to minimize direct adverse impacts. However, where construction would occur in relatively undisturbed native habitats, such as those that could support plant and wildlife species, restoration and revegetation would not result in habitat functionally equivalent to preexisting native vegetation. Additionally, wildlife use of the habitat would be limited during the time the replacement habitat is being restored. If construction were to occur when birds (including migratory birds and BCC) are foraging, migrating, or nesting, it could lead to direct removal or impact to individuals or their habitats that support those species within and possibly nearby the construction or land clearing area. Time-of-year restrictions will be implemented to the maximum extent practicable to avoid impacts to birds. This would be avoided by planning construction outside important nesting seasons (typically March through August). If time-of-year restrictions cannot be avoided, the Navy will conduct pre-construction nesting bird surveys using a qualified biologist.

During operation and maintenance, noise from periodic use of mowing equipment and human presence during patrols could disturb wildlife. In addition, use of herbicides could impact water quality and vegetation used as habitat. With use of BMPs for equipment operation and herbicide use and adherence to time-of-year restrictions or conducting nesting bird surveys, Alternative 1 would not result in a significant impacts to wildlife.

Limited indirect impacts to wildlife could occur during construction from soil disturbance caused by personnel and equipment access, and wind and water erosion, which would be localized, temporary, and reduced or avoided by implementing measures including identification of access routes, stormwater pollution prevention, and restoration techniques.

There is no EFH located within the project area. However, direct impacts to aquatic habitats could occur during construction of the fence/clear zone across the two intermittent streams and wetland areas. Construction would be conducted during no or low-flow, if practicable, and as quickly as possible to reduce impacts. Culverts would be used to allow passage of any fish or other aquatic organisms. Indirect impacts to aquatic and wetland habitats could also occur from erosion and movement of sediment or soil, or migration of sediment or pollutants during construction. Implementation of BMPs would protect surface water resources during construction as well as protect aquatic and wetland habitats from runoff and erosion.

In summary, construction and land clearing would result in removal of vegetation and wildlife habitat causing disturbance of plants and wildlife within the affected areas. Direct adverse impacts to terrestrial and aquatic wildlife and habitats would be minimized and avoided by conducting pre-construction surveys, as needed, identifying impact-minimizing access routes, implementing soil stabilization and restoration techniques, applying habitat restoration and revegetation efforts, planning construction outside important nesting seasons, if practicable, and BMPs to protect surface water resources. Restricting nonessential equipment and personnel access to construction areas using existing disturbed areas where feasible for access roads and laydown areas, restoring disturbed areas, and using BMPs to reduce dust, erosion, and sedimentation would reduce potential direct adverse impacts wildlife species or their habitat. Therefore, direct adverse impacts to wildlife would be discountable and insignificant.

Migratory Birds

Clearing of the forest areas would result in impacts to migratory birds (including BCC); however, the forested areas to be cleared consist of a small portion of the overall available forested habitats at JB CHS-WS. Adult birds would be able to escape clearing activities; however, their nests, eggs, and nonflying young would not. To protect migratory birds, JB CHS-WS would continue to operate in accordance with the MBTA through the various natural resource programs conducted as part of the INRMP. As previously described above for wildlife, time-of-year restrictions for land clearing and construction will be implemented to the maximum extent practicable to avoid impacts to birds (typically March through August). If time-of-year restrictions cannot be avoided, the Navy will conduct pre-construction nesting bird surveys using a qualified biologist immediately prior to work commencing on site to ensure that there are no nesting birds or active nests within the construction area. During operation and maintenance, noise from mowing equipment and human present during patrols could disturb migratory birds. In addition, use of herbicides could impact water quality and vegetation used as habitat. With use of BMPs for equipment operation and herbicide use and adherence to time-of-year restrictions or conducting nesting bird surveys, Alternative 1 would not result in a significant adverse effect on a population of migratory birds.

Bald and Golden Eagles

No bald eagle nests occur within the project area. Additionally, no construction or land clearing would occur within one mile of the closest known active nesting location, known as the Brick Hope nest located 1.02 miles from the project area.

Under the INRMP, JB CHS-WS would continue to employ eagle management practices including annual monitoring surveys, protection of existing and historical nest trees, and coordination with the USFWS. Therefore, Alternative 1 would not result in significant impacts to bald eagles.

Threatened and Endangered Species

Under Alternative 1, federally listed species would continue to be managed and monitored under the INRMP including annual coordination with the USFWS. Potential impacts to federally listed species under Alternative 1 would be similar to those described above for terrestrial wildlife. The Navy determined that Alternative 1 may affect but is not likely to adversely affect the RCW and wood stork. The Navy determined no effect on the northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry, as they are not known to occur or do not have potential to occur within the project area and/or would not be affected by the Proposed Action. A Biological Evaluation was submitted to the USFWS on May 30, 2019, to initiate informal consultation under ESA section 7. USFWS concurred with the Navy's effect determinations on June 12, 2019. (Appendix C, Endangered Species Act Documentation, contains a full discussion of effects determinations, analyses for all species, and the USFWS concurrence letter dated June 12, 2019).

Specific effects determinations for the RCW and wood stork are presented below.

Red-cockaded Woodpecker

Mature pine stands that could support relic trees suitable for RCW cavities are scarce. Based on SCDNR Element Occurrence Records, four clusters have been identified post-Hurricane Hugo on the base. However, survey results indicate that in spite of population management efforts the species cannot survive at JB CHS-WS until post-hurricane pine stands mature to the point that they again become suitable RCW foraging habitat (North Wind, Inc., 2016).

To meet ESA requirements, potential RCW nesting and foraging habitat at JB CHS-WS is monitored annually in accordance with USFWS guidelines (Navy, 2013; U.S. Air Force, 2015). Additionally, five-year installation-wide surveys are performed to document RCW activity and new cluster potential, focusing on suitable habitat areas most attractive to the woodpeckers but previously uninhabited.

As part of the RCW MP, RCW Management Units have been designated to preserve and enhance potential suitable habitats on base. Timberland forests are managed to produce sustainable old-growth pine stands suitable for clusters, replacement stands, and foraging areas.

Under Alternative 1, impacts to approximately 0.06 acres of potential RCW habitat would occur within the clear zone just north of Vetr Road (Figure 3-4). Although impacts in the form of habitat degradation or loss would result, impacts would not be considered significant because similar habitat is available nearby. JB CHS-WS manages approximately 2,222 acres of timberland designated as Management Units for this species. Current management practices as outlined in the INRMP, RCW MP, and WFMP would be employed to protect, preserve, and encourage suitable habitats for RCW at the base. RCW clusters and cavity trees would continue to be monitored annually and new installation-wide surveys would occur every five years. Alternative 1 would not impede ongoing habitat management with prescribed burns that would continue to have beneficial impacts to the species.

Additionally, construction to the extent practicable would occur outside of the RCW nesting season, which occurs from April through June. If time-of-year restrictions cannot be avoided, the Navy will conduct pre-construction RCW bird surveys using a qualified biologist immediately prior to work commencing onsite to ensure that there are no nesting birds or active nests within the construction area. Therefore, the Navy has determined that the Proposed Action *may affect*, but is *not likely to adversely affect* the RCW.

Wood Stork

Potential suitable habitat for the wood stork is known to occur in the wetlands, ponds, and marsh areas at JB CHS-WS; however, there are no known nesting colonies or rookeries at or near JB CHS-WS. Based on SCDNR Element Occurrence Records, the nearest known active wood stork rookery is located approximately 4 miles west of JB CHS-WS on Charleston Southern University (North Wind, Inc., 2016).

To manage potential suitable habitat for the wood stork within the base boundaries, JB CHS-WS provides maintenance of existing wetland habitats through the INRMP program (U.S. Air Force, 2015).

Direct effects to the wood stork would occur from habitat disturbance from the construction within the wetland areas that serve as potential suitable foraging habitat. Permanent and temporary impacts would occur near the construction site due to the presence of humans and increased noise levels. Temporary noise associated with construction would be within normally occurring levels and negligible compared to the other frequent noise sources at the base. Wood storks visiting the base are likely acclimated to the current conditions (e.g., noise and human disturbance). If individuals are present, they would likely avoid or continue normal behavior during the proposed construction. Although impacts in the form of habitat degradation or loss would result, impacts would not be considered significant because similar habitat is available nearby. There are 17 freshwater ponds on JB CHS-WS totaling 226 acres (U.S. Air Force, 2015).

Under Alternative 1, current management practices as outlined in the INRMP would be employed to maintain other available wetland habitats on base. Therefore, the Navy has determined the Proposed Action *may affect*, but is *not likely to adversely affect* the wood stork.



Figure 3-4 Location of the Red-cockaded Woodpecker Management Unit and the Proposed Fence/Clear Zone

3.2.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for the analysis of effects to biological resources associated with Alternative 2 is the same as Alternative 1. Alternative 2 includes the same fence and clear zone alignment but a different crossing methodology for streams and wetland areas.

Implementation of Alternative 2 would result in the same impacts to biological resources as those described for vegetation, terrestrial wildlife (including migratory birds and bald eagles), and threatened and endangered species under Alternative 1. Therefore, implementation of Alternative 2 would not result in significant impacts to biological resources.

3.2.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for the analysis of effects to biological resources associated with Alternative 3 is similar to Alternative 1. Alternative 3 includes fence and clear zone alignment, but the patrol road would not be continuous. Impacts to biological resources would be similar but slightly less than Alternative 1.

Alternative 3 would disturb an area of approximately 5.50 acres of forest stand and 1.37 acres of wetland areas. However, as described under Alternative 1, impacts to the types of vegetation present would not be considered significant as the loss of habitat would represent less than one-tenth of 1 percent (i.e., 0.07 percent) of the total habitat available on JB CHS-WS. Additionally, adherence to the installation's *Integrated Pest Management Plan* would address invasive species and use of herbicides for annual vegetation maintenance in accordance with all applicable regulations.

Implementation of Alternative 3 would result in similar impacts to biological resources as those described for vegetation, terrestrial wildlife (including migratory birds and bald eagles), and threatened and endangered species as described for Alternative 1. Therefore, implementation of Alternative 3 would not result in significant impacts to biological resources.

3.2.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for the analysis of effects to biological resources associated with Alternative 4 is similar to Alternative 1. Alternative 4 includes a similar fence and clear zone alignment as Alternative 1 but the student parking area would not be enclosed. The fence route would be slightly longer than Alternative 1. Impacts to biological resources would be similar but slightly greater than Alternative 1.

Alternative 4 would disturb an area of approximately 10.28 acres of forest stand and 4.41 acres of wetland areas. However, as described under Alternative 1, impacts to the types of vegetation present would not be considered significant as the loss of habitat would represent about one-tenth of 1 percent (0.12 percent) of the total habitat available nearby. Additionally, adherence to the installation's *Integrated Pest Management Plan* would address invasive species and use of herbicides for annual vegetation maintenance in accordance with all applicable regulations. Direct adverse impacts to plants and wildlife would be minimized and avoided by identifying access routes, implementing soil stabilization and restoration techniques, habitat restoration and revegetation efforts, planning construction outside important nesting seasons for migratory birds and RCW, and BMPs to protect surface water resources. Base personnel would continue to manage habitats according to the INRMP, which protects and benefits vegetation, wildlife, migratory birds, bald eagles, and threatened and endangered species and suitable habitats at JB CHS-WS.

Implementation of Alternative 4 would result in similar impacts to biological resources as those described for vegetation, terrestrial wildlife (including migratory birds and bald eagles), and threatened and endangered species under Alternative 1. Therefore, implementation of Alternative 4 would not result in significant impacts to biological resources.

3.3 Land Use

This section describes land use at JB CHS-WS located in the city of Goose Creek in Berkeley County, South Carolina. NNPTC and NHCC are specifically located within the planning area of Goose Creek.

Information on existing land use conditions was obtained from the 2017 Joint Base Charleston, South Carolina (JB CHS) Installation Development Plan (IDP), revised on February 21, 2018. The IDP serves the same function as a separate but similar JB CHS General Plan, dated January 2009. In addition, the section provides an overview of the CZMA regulated by the South Carolina Department of Health and Environmental Control (SCDHEC).

3.3.1 Regulatory Setting

Land use around JB CHS-WS is principally controlled by the municipal zoning ordinances of the City of Goose Creek; however, other programs that inform growth and development in and around JB CHS-WS include:

- JB CHS IDP Marrington Planning District
- JB CHS IDP Waterfront Planning District
- Goose Creek Comprehensive Plan
- CZMA

The JB CHS IDP Framework Plan (revised on February 21, 2018) details five planning districts “delineated based on form and function, including physical infrastructure, natural and man-made boundaries and landmarks, and mission functions,” that guide future development planning (U.S. Air Force, 2018a). The areas in and around the NNPTC and NHCC are Marrington Planning District and the Waterfront Planning District. The Marrington Planning District encompasses the central portion of JB CHS-WS, including NNPTC and NHCC. The Waterfront Planning District encompasses the southern portion of JB CHS-WS, including the waterfront south of Red Bank Road. The IDP recommends initiating an Area Development Plan for each respective planning district where “additional planning guidance is needed to determine a more specific future for a particular area” (U.S. Air Force, 2018a).

The City of Goose Creek has adopted a comprehensive plan that provides guidance for physical development and preservation of the City’s natural and cultural resources, and establishes a set of guidelines and procedures for use by local decision-makers. The latest comprehensive plan was updated in 2015. The comprehensive plan is supported by a future land use map, Capital Improvements Program, and Facilities/Infrastructure Plan to coordinate and support all future development, redevelopment, and land use decisions. Military is the largest land use type, designated as an Institutional District within the future land use map, within the Goose Creek Planning Area. Since it does not have regulatory land use authority within the JB CHS-WS, the City includes consideration of updating the comprehensive plan and creating a master plan in the event of a base closure (City of Goose Creek, 2015).

Through the CZMA, Congress established national policy to preserve, protect, develop, restore, or enhance resources in the coastal zone. This Act encourages coastal states to properly manage use of

their coasts and coastal resources, prepare and implement coastal management programs, and provide for public and governmental participation in decisions affecting the coastal zone. To this end, CZMA imparts an obligation upon federal agencies whose actions or activities affect any land or water use or natural resource of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. However, federal lands, which are “lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents,” are statutorily excluded from the state’s “coastal uses or resources.” If, however, the proposed federal activity affects coastal uses or resources beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA Section 307 federal consistency requirement applies. As a federal agency, the Navy is required to determine whether its proposed activities would affect the coastal zone. This takes the form of a consistency determination, a negative determination, or a determination that no further action is necessary.

3.3.2 Affected Environment

The following discussions provide a description of the existing conditions for land use resources at JB CHS-WS. Existing land use for the NNPTC and NHCC areas is identified in the IDP as Administrative; the areas immediately west, north, and east are identified as Community Commercial; to the west of those areas is Housing Accompanied; and to the north and east of those areas is a mix of Open Space/Buffer Zone and Outdoor Recreation. South of NNPTC and NHCC is Industrial. Future land use for the NNPTC and NHCC areas is identified as a mix of Medical/Dental and Operations and Maintenance; the areas west are Administrative, north and east are a mix of Open Space/Buffer Zone and Outdoor Recreation, and south is Industrial.

The areas immediately north and east of NNPTC and NHCC remain mostly undeveloped as forest and wetlands. Foster Creek is located to the north, and the Berkeley County Water and Sanitation’s Lower Berkeley Wastewater Treatment Facility and the Copper River are located to the east. South of NNPTC and NHCC is Red Bank Road with a mix of large undeveloped areas due to wetlands, marshes, and Explosive Safety Quantity Distance arcs. West of NNPTC and NHCC are residential and commercial areas and the city of Goose Creek. Marrington Elementary and Middle Schools (Berkeley County School System) are located immediately northwest of the NNPTC.

NNPTC and NHCC are located within Subdistrict 4A of the Marrington Planning District, which is “characterized primarily by community support and the presence of significant supported commands and unaccompanied housing area with a homogenous character.” Areas south of NNPTC and NHCC are located within Subdistrict 5A of the Waterfront Planning District, which is “characterized primarily by ordnance storage and specific mission requirements that will affect compatible uses” (U.S. Air Force, 2018a). Other land use categories for JB CHS-WS identified by the Marrington and Waterfront Planning Districts in the IDP include:

- **Open Space.** The Marrington Planning District and Waterfront Planning District in the IDP show JB CHS-WS as containing a large amount of acreage dedicated to Open Space. Open Space is a permitted use in Marrington Planning District Subdistrict 4A and Waterfront Planning District Subdistrict 5A.
- **Outdoor Recreation.** The Marrington Planning District and Waterfront Planning District in the IDP show JB CHS-WS to contain a large amount of acreage dedicated to Outdoor Recreation. Outdoor Recreation is a permitted use in Marrington Planning District Subdistrict 4A, and it is permitted with specific restrictions in Waterfront Planning District Subdistrict 5A. Due to existing wetlands and

floodplains within the Marrington Planning District, recreational functions are generally low-density and low-impact. Trails located on-base are used by the students for walking, jogging, and running.

JB CHS-WS is located within the coastal zone of South Carolina. SCDHEC is the lead agency for coastal management and is responsible for enforcing the state's federally approved coastal management plan.

3.3.3 Environmental Consequences

The location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. Factors affecting a proposed action in terms of land use include its compatibility with on-site and adjacent land uses, restrictions on public access to land, or change in an existing land use that is valued by the community. Other considerations are given to proximity to a proposed action, the duration of a proposed activity, and its permanence.

3.3.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to land use. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.3.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The site proposed for Alternative 1 and adjacent lands define the study area for land use analyses. Alternative 1 would be consistent with the JB CHS IDP and the Goose Creek Comprehensive Plan. The IDP identifies the fence and clear zone project as a recommended future development project. The proposed fence alignment would not enclose an area proposed for future Navy development. However, as part of the 10-year base development planning process, future development in this area is not reasonably foreseeable.

Open Space. Under the IDP, the amount of designated Open Space within the NNPTC and NHCC footprints would decrease due to the proposed 2.47 miles of fencing and patrol road, and total temporary and permanent disturbance of 14.90 acres under the existing land use map. However, these impacts would not be significant because the Proposed Action wholly occurs on land re-designated from Open Space to Administrative and Medical/Dental land uses under the future land use map.

Outdoor Recreation. Under Alternative 1, there would be no changes to designated Outdoor Recreation because the Proposed Action wholly occurs on land already designated as future Administrative and Medical/Dental land uses. The recreational trails would be accessible with the construction of pedestrian gates; therefore, Alternative 1 would not restrict student access to on-base trails. As a result, there would be minimal impact on outdoor recreational facilities.

Coastal Zone. Implementing Alternative 1 would not adversely affect coastal zone resources. The Navy, through the Coastal Consistency Determination process, has determined that implementing Alternative 1 would be conducted in a manner that is consistent to the maximum extent practicable with the state's coastal zone enforceable policies. The Coastal Consistency Determination was submitted to SCDHEC (Appendix F).

Land use impacts under Alternative 1 would not be significant because the IDP future land use map re-designates land around NNPTC and the NHCC from Open Space to Administrative and Medical/Dental land uses. In addition, the fence project was identified as a future project, and access to recreational

trails would not be restricted with use of pedestrian gates. Therefore, implementation of Alternative 1 would not result in significant impacts to land use.

3.3.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for the analysis of effects to land use for Alternative 2 is the same as Alternative 1. Impacts under Alternative 2 would be the same as Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to land use.

3.3.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for the analysis of effects to land use associated with Alternative 3 is similar to Alternative 1. Impacts under Alternative 3 would be the similar to Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to land use.

3.3.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for the analysis of effects to land use associated with Alternative 4 is similar to Alternative 1. Impacts under Alternative 4 would be the same as Alternative 1 except the fence alignment around the student parking would result in slightly greater impact to open space under the existing land use. However, these impacts would not be significant because the IDP future land use map re-designates land around NNPTC and the NHCC from Open Space to Administrative and Medical/Dental land uses. In addition, the fence project was identified as a future project, and access to recreational trails would not be restricted with use of pedestrian gates. Therefore, implementation of this action alternative would not result in significant impacts to land use.

3.4 Geological Resources

This discussion includes soil stability and properties. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility determine the ability for the ground to support structures and facilities. Soils are typically described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use.

3.4.1 Regulatory Setting

Consideration of geologic resources extends to prime or unique farmlands. The Farmland Protection Policy Act (FPPA) was enacted in 1981 in order to minimize the loss of prime farmland and unique farmlands as a result of federal actions. The implementing procedures of the FPPA require federal agencies to evaluate the adverse effects of their activities on farmland, which includes prime and unique farmland and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. The Farmland Protection Policy Act does not apply as this action is being proposed for a national defense purpose during a time of national emergency (Federal Register, 2018).

3.4.2 Affected Environment

The following discussions describe the existing soil conditions at JB CHS-WS. Existing conditions related to soils were characterized by reviewing the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) and soil survey.

Figure 3-5 presents the soil types at JB CHS-WS. Soil unit descriptions from the NRCS Soil Survey (NRCS, Soil Survey of Berkeley County, South Carolina, 1980) and the SSURGO database (NRCS, 2018c) are presented below; Table 3-6 summarizes existing soil types and characteristics.

Table 3-6 Existing Soil Types and Characteristics

<i>Map Symbol</i>	<i>Soil Series</i>	<i>Hydric^a</i>	<i>Compaction Prone^b</i>	<i>Highly Erodible</i>		<i>Revegetation Concerns^c</i>	<i>Risk of Corrosion</i>	
				<i>Due to water^c</i>	<i>Due to wind^d</i>		<i>Concrete</i>	<i>Uncoated Steel</i>
BoB	Bonneau loamy sand, 2–6% slopes	No	No	No	Yes	No	High	High
CoB	Caroline fine sandy loam, 2–6% slopes	No	No	No	No	No	High	High
CvB	Craven loam, 2–6% slopes	No	No	No	No	No	Moderate	High
DuB	Duplin fine sandy loam, 2–6% slopes	No	No	No	No	No	Moderate	High
GoA	Goldsboro loamy sand, 0–2% slopes	No	No	No	Yes	No	High	High
Oc	Ocilla loamy fine sand	Yes	Yes	No	Yes	No	High	High
Pe	Pantego fine sandy loam	Yes	Yes	No	No	No	High	High

Soil Descriptions (NRCS, Soil Survey of Berkeley County, South Carolina, 1980)

Bonneau loamy sand, 2–6 percent slopes. Bonneau soils are gently sloping, deep, and well drained. This soil is found on broad ridges and on narrow slopes parallel to streams. Surface runoff is slow and available water capacity is low. Soil blowing is a hazard. Conservation practices to control erosion are needed if this soil is used for row crops.

Caroline fine sandy loam, 2–6 percent slopes. This soil is gently sloping, deep, well drained, and occurs on narrow ridges and slopes parallel to streams and drainageways. Caroline soils have moderately slow permeability. Surface runoff is medium and available water capacity is high.

Craven loam, 2–6 percent slopes. This soil type is gently sloping, deep, and moderately well drained and occurs on broad ridges and narrow slopes along streams and drainageways. Craven soils have slow or very slow permeability. Surface runoff and available water capacity are medium.

Duplin fine sandy loam, 2–6 percent slopes. Duplin soils are gently sloping, deep, moderately well drained, and located on broad ridges and narrow slopes along streams and drainageways. Duplin soils have moderately slow permeability. Surface runoff is slow and available water capacity is high.

Goldsboro loamy sand, 0–2 percent slopes. This soil type is nearly level, occurs on broad flats, and is moderately well drained. Goldsboro soils have moderate permeability. Surface runoff is slow and available water capacity is medium. Row crops require drainage improvements such as open ditches and/or tile drains.

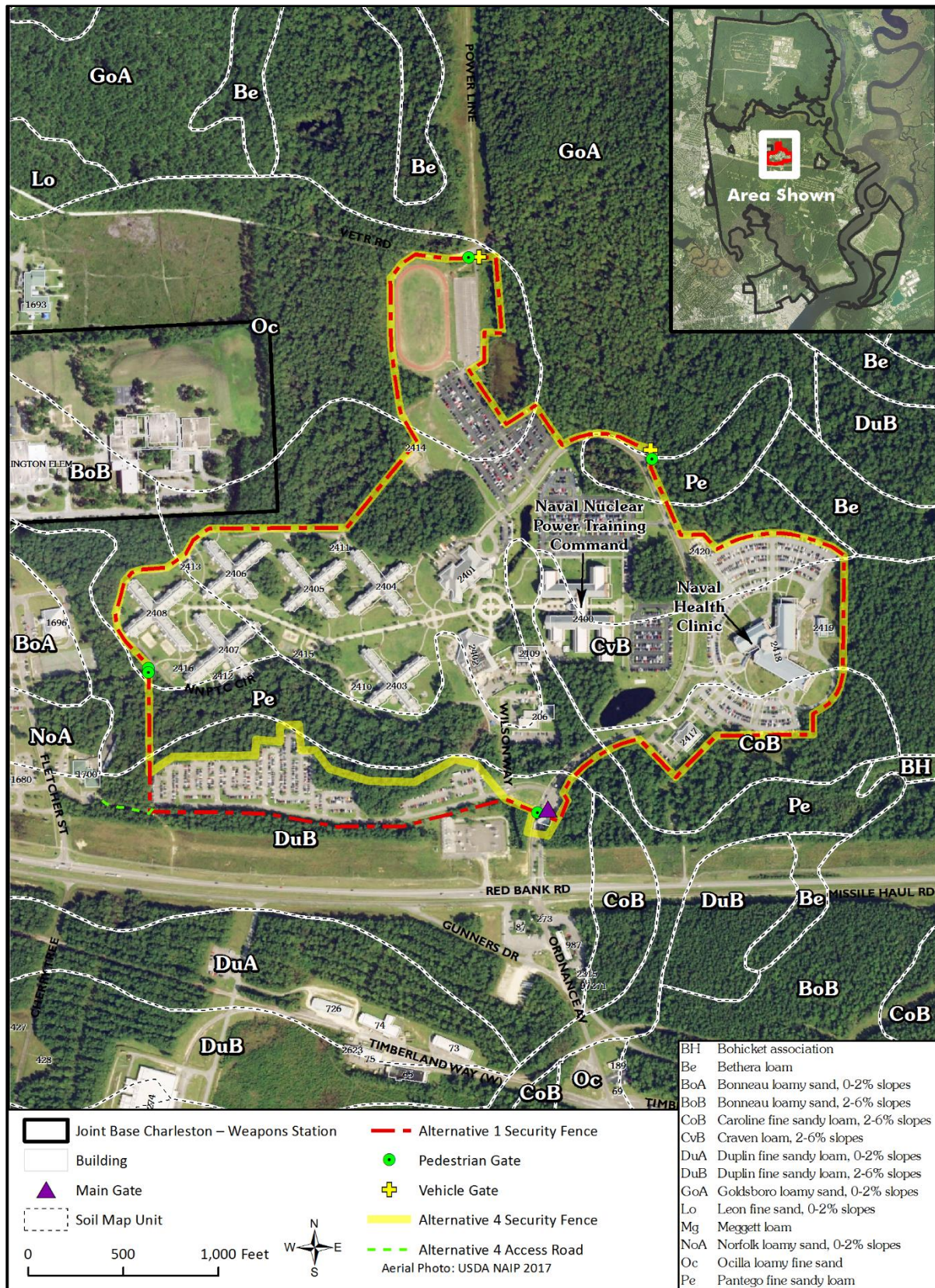


Figure 3-5 Soil Types at JB CHS-WS

Ocilla loamy fine sand. Ocilla soils are nearly level, deep, and somewhat poorly drained. These soils have rapid permeability in the surface layer and moderate in the subsoil. Surface runoff is slow and available water capacity is low. Open ditches and/or tile drains are used to drain this soil.

Pantego fine sandy loam. These soils are nearly level, deep, and very poorly drained. The soil is found in broad, slightly depressional areas and along drainageways. Pantego soils have moderate permeability. Surface runoff is ponded or very slow and available water capacity is high. A seasonal high water table is the major hazard associated with the soil.

Hydric Soils and Compaction Potential

According to NRCS, hydric soils are defined as: “A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (NRCS, 2018a). Ocilla loamy fine sand and Pantego fine sandy loam are considered hydric soils.

Soils were identified as being prone to compaction if they had a somewhat poorly, poorly, or very poorly drained classification including Ocilla loamy fine sand and Pantego fine sandy loam. Construction equipment on wet soils could cause rutting, an increase in the potential for runoff, and reduce the porosity and moisture-holding capacity of soils.

Soil Erosion

The potential for soil erosion by water and wind were evaluated using the NRCS soil database (NRCS, 2018c). Erosion by water was evaluated using the *K* factor. *K* factor values range from 0.02 representing the least erodible soils to 0.64 for the most erodible soils (NRCS, no date). Soils with a *K* factor of 0.4 to 0.69 and steep slopes are not present. Soils with a wind erodibility index of 1 or 2 were considered to have a high potential for wind erosion. Bonneau and Goldsboro loamy sand and Ocilla loamy fine sand have wind erodibility indices of 2.

Revegetation

Soils that are very poorly drained, have a *K* factor of 0.40 to 0.69, and/or have a steep slope were considered to have a low revegetation potential. As shown in Table 3-6, Ocilla loamy fine sand is somewhat poorly drained and Pantego fine sandy loam is very poorly drained; therefore, revegetation potential could be affected. Soils with a *K* factor of 0.40 to 0.69 and steep slopes are not present.

Risk of Corrosion

SSURGO data were used to determine the risk of corrosion both for unprotected steel and concrete. As shown in Table 3-6, the soils in the project area have a high potential for corrosion. Only Craven loam and Duplin fine sandy loam had a medium corrosion risk for concrete.

3.4.3 Environmental Consequences

Geological resources (soils only) were analyzed in terms of hydric soils, erosion, revegetation potential, and risk of corrosion. The analysis of soils focused on the area of soils that would be disturbed, the potential for erosion of soils from construction areas, and the potential for eroded soils to become pollutants in downstream surface water during storm events. BMPs are identified to minimize soil impacts and prevent or control pollutant releases into stormwater. The potentially affected environment for soil resources is limited to lands that would be disturbed by the fence and clear zone. The acreages of soil impacts based on soil types are presented in Table 3-7.

3.4.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and there would be no change to baseline soil conditions. Therefore, no significant impacts to soil resources would occur with implementation of the No Action Alternative.

3.4.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area encompasses the proposed ground disturbance areas related to constructing and maintaining a security fence, patrol road, gates, and lighting along the proposed alignment shown in Figure 2-3. Table 3-7 shows the acreage of soil impacts for each alternative.

Table 3-7 Acreage of Soil Impacts

Soil Map Unit	Soil Series Name	Cleared Area (acres)			Gravel Road (acres)			Total (Acres)		
		Alt 1 or Alt 2	Alt 3	Alt 4	Alt 1 or Alt 2	Alt 3	Alt 4	Alt 1 or Alt 2	Alt 3	Alt 4
BoB	Bonneau loamy sand, 2–6% slopes	0.80	0.42	0.80	0.25	0.00	0.25	1.05	0.42	1.05
CoB	Caroline fie sandy loam, 2–6% slopes	1.47	1.12	1.46	0.46	0.24	0.46	1.93	1.36	1.92
CvB	Craven loam, 2–6% slopes	0.50	0.50	0.50	0.16	0.16	0.16	0.66	0.66	0.66
DuB	Duplin fine sandy loam, 2–6% slopes	2.41	2.20	2.68 0.34 (access road)	0.75	0.60	0.82	3.16	2.80	3.84
GoA	Goldsboro loamy sand	3.05	2.45	3.05	0.93	0.57	0.93	3.98	3.02	3.98
Oc	Ocilla loamy fine sand	2.30	1.82	2.30	0.72	0.40	0.72	3.02	2.22	3.02
Pe	Pantego fine sandy loam	0.82	0.47	0.92	0.28	0.00	0.32	1.10	0.47	1.24

Key: Alt = Alternative

Hydric Soils and Compaction Potential. Under Alternative 1, construction would temporarily impact approximately 4.12 acres of hydric soils. Upon completion of construction, the vegetation would be permanently maintained to 8-inches tall. Approximately 1.00 acre would be compacted and used as a gravel patrol road. Hydric soils can indicate wetland areas and are described in Section 3.1 (Water Resources). Hydric soils may be prone to compaction and rutting. The Navy would require its contractor to use BMPs to minimize impacts on hydric soils and to reduce compaction. Therefore, Alternative 1 would not pose significant impacts to hydric and compaction prone soils.

Soil Erosion. Soil erosion could occur during construction when soils would be disturbed. Soils were evaluated for water erosion potential using the *K* factor. Soils with a *K* factor greater than 0.4 were considered to be more highly erodible soils and none are present within the clear zone. Soils with a wind erodibility index of 1 or 2 were considered to have a high potential for wind erosion and these include Bonneau (1.05 acres) and Goldsboro loamy sand (3.98 acres) and Ocilla loamy fine sand (3.02 acres). BMPs would reduce the potential for soil erosion.

JB CHS-WS has an SWPPP that identifies the potential sources of stormwater pollution, describes stormwater control measures to reduce or eliminate the identified pollutants, and identifies procedures needed to comply with specific permit conditions. Construction of the fence and clear zone would require a Construction General Permit administered as part of the Stormwater Management Program. BMPs included in the SWPPP will be implemented by the contractor. Therefore, Alternative 1 would not pose significant impacts soil erosion prone soils.

Revegetation Potential. Soils that are excessively drained or very poorly drained, have a *K* factor of 0.40 to 0.69, and/or have a steep slope were considered to have a low revegetation potential. Soils classified as somewhat poorly drained are Ocilla loamy fine sand (3.02 acres) and very poorly drained are Pantego fine sandy loam (1.10 acres). No soils have a *K* factor greater than 0.4 or steep slopes. The Navy would require its contractor to use BMPs to minimize impacts associated with low revegetation potential. Therefore, Alternative 1 would not pose significant impacts to soils that have low revegetation success.

Risk of Corrosion. The soils have a high corrosion risk with concrete and steel, except for Craven loam and Duplin fine sandy loam, which are rated moderate for concrete. The design of the fence and posts would consider this limitation. With BMPs, Alternative 1 would not pose significant impacts to soils prone to corrosion.

JB CHS-WS has an SWPPP and would require a Construction General Permit for discharges of stormwater associated with construction activities. BMPs would reduce potential impacts to stormwater. BMPs applicable to construction would include minimizing the amount of disturbed soil, preventing runoff from offsite areas from flowing across disturbed areas, slowing runoff flow, and preserving site vegetation during construction where possible. Therefore, Alternative 1 would not result in significant impacts to soil resources.

3.4.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for Alternative 2 is the same as Alternative 1. Alternative 2 includes the same fence and clear zone alignment but a different crossing methodology for streams and wetland areas. Impacts to hydric soils and compaction potential, soil erosion, revegetation potential, and risk of corrosion would be similar but less than those described under Alternative 1. This alternative would have less depth of fill and no new or extended culverts. Compliance with the permit conditions and implementation of BMPs specified in the SWPPP would decrease the impacts on soils. BMPs applicable to construction would include minimizing the amount of disturbed soil, preventing runoff from offsite areas from flowing across disturbed areas, slowing runoff flow, and preserving site vegetation during construction where possible. There could be impacts to soils; however, with implementation of BMPs, Alternative 2 would not result in significant impacts to soil resources.

3.4.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for Alternative 3 is similar to Alternative 1. Alternative 3 includes fence and clear zone alignment, but the patrol road would not be continuous. Impacts to soils would be similar but less than Alternative 1 with the lack of a continuous patrol road and narrowing of the clear zone in wetland and stream crossing areas to 20-feet. Impacts to hydric soils and compaction potential, soil erosion, revegetation potential, and risk of corrosion would be less than those described under Alternative 1. Compliance with the permit conditions and implementation of BMPs specified in the SWPPP would decrease the impacts on soils. Therefore, Alternative 3 would not result in significant impacts to soil resources.

3.4.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for Alternative 4 is similar to Alternative 1. Alternative 4 includes a fence and clear zone alignment that does not enclose the student parking area; however, the fence alignment would be longer since the route would not be as direct as enclosing the student parking area. This alternative would contain 2.56 miles of fencing and patrol road plus an additional access road that would be 0.06 mile. (For comparison, Alternative 1 would have 2.47 miles of fence and patrol road.) Impacts to soils would be greater than Alternative 1 due to the longer fence and patrol road and need for an additional access road. Impacts to hydric soils and compaction potential, soil erosion, revegetation potential, and risk of corrosion would be the greater than those described under Alternative 1. Compliance with the permit conditions and implementation of BMPs specified in the SWPPP would decrease the impacts on soils. Therefore, Alternative 4 would not result in significant impacts to soil resources.

3.5 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.5.1 Regulatory Setting

Cultural resources are governed by other federal laws and regulations, including the National Historic Preservation Act (NHPA), Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by Sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws.

3.5.2 Affected Environment

Cultural resources listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable State

Historic Preservation Officer. A NRHP-eligible property has the same protections as a property listed in the NRHP. The historic properties include archaeological and architectural resources.

The Navy has conducted inventories of cultural resources at JB CHS-WS to identify historic properties that are listed or eligible for listing in the NRHP (U.S. Air Force, 2018b).

Archaeological Resources

The Navy determined that the area of potential effects (APE) for archaeological resources includes the area in which the proposed fence and clear zone (i.e., chain-link perimeter security fence and patrol road) would be built. Under Alternative 1, the clear zone would enclose the NNPTC, NHCC, barracks, and associated parking areas, and the APE includes 14.90 acres. Under Alternatives 2 and 3, the clear zone would enclose the same area as Alternative 1, but the security fence and patrol road at the wetland areas would differ. The Alternative 2 APE includes 14.90 acres and the Alternative 3 APE includes 10.95 acres. Under Alternative 4, the fence alignment would be the same as Alternative 1 except the student parking area would not be enclosed, and there would be an additional access road (0.34 acre) and a minimum of two more pedestrian gates. The Alternative 4 APE for ground disturbance would consist of 15.71 acres (Figure 2-3).

Nine cultural resources survey projects with archaeological investigation components have been conducted at JB CHS-WS, resulting in the identification of 130 archaeological sites (U.S. Air Force, 2018b). All undisturbed areas on the base have been surveyed and inventoried. Twelve archaeological sites on the base are individually eligible for listing in the NRHP, and 13 are contributing resources to one of two NRHP-eligible Historic Districts. The remaining sites are not eligible for listing in the NRHP. None of these sites are within the APEs for archaeological resources.

In 1996, the Navy conducted an archaeological survey of the (then) proposed NNPTC facility and associated areas. This survey covered all but the northernmost portion of the APE, and no archaeological sites were identified (Poplin, Rust, & Bailey Jr., 1996). In 1999, the Navy conducted another archaeological survey of JB CHS-WS that included the northernmost portion of the APE, in which no archaeological sites were identified (Brockington and Associates, Inc., 2002).

Architectural Resources

The Navy determined that the APE for architectural resources includes the proposed construction area of the fence and patrol road that would surround NNPTC, NHCC, barracks, and associated parking areas. An area extending 0.25 mile outside the proposed clear zone was also reviewed to include the viewshed.

From 2012–2013, the Navy inventoried and evaluated the built environment of JB CHS-WS that was constructed between 1918 and 1968 (U.S. Air Force, 2018b). Of these facilities, none are individually eligible for listing in the NRHP. There is one NRHP-eligible Historic District, the Polaris Missile Magazine Historic District, that originally contained 113 contributing resources, and of which 64 are extant. The Polaris Missile Magazine Historic District is covered under the Program Comment for World War II and Cold War Era (1939–1974) Ammunition Storage Facilities (Advisory Council on Historic Preservation, 2006a), and all Section 106 requirements have been fulfilled for the district.

Two Program Comments—Cold War Era Unaccompanied Personnel Housing (Advisory Council on Historic Preservation, 2006b) and World War II and Cold War Era Ammunition Storage Facilities (Advisory Council on Historic Preservation, 2006a)—address the Section 106 responsibilities of another 129 architectural resources. An additional 984 resources are covered by the Housing Public/Private

Venture Programmatic Agreement and Capehart-Wherry Housing Program Comment (Advisory Council on Historic Preservation, 2004; U.S. Air Force, 2018b).

All buildings inside the NNPTC complex, except the Safety Building (Building 206), were built in 1997–1998, and therefore are not considered to have NRHP-eligibility potential.

Outside the NNPTC complex, there are five buildings within the 0.25-mile viewshed of the proposed clear zone, with one known to be eligible for listing in the NRHP and four not evaluated (Table 3-8).

Building 87 (Open Mess) was constructed in 1953 and has been determined not eligible for listing in the NRHP (Navy, 2012). Building 273 (Guard Shack) was built in 1985 and has not been subject to inventory and evaluation; however, as a less than 50-years-old support facility not essential to the Cold War mission, it does not have potential to achieve the exceptional significance threshold necessary for NRHP eligibility. Building 987 (Ordnance Facility) was built in 1976 and has not been inventoried and evaluation. Building 1696 (Exch Svc Outlet) has not been subject to inventory and evaluated but is not contained within the Integrated Cultural Resources Management Plan (ICRMP). It is likely associated with utilities and not eligible (Covington, 2019). Building 1700 (Outdoor Recreation Mall) was built in 2003, and as a modern facility, it does not have NRHP-eligibility potential.

Table 3-8 Buildings Outside the NNPTC Complex within the Viewshed of the Proposed Clear Zone

<i>Building Number</i>	<i>Current Function</i>	<i>Construction Date</i>	<i>Historic Context</i>	<i>NRHP Status</i>
87	Open Mess	1953	Cold War	Not Eligible ¹
273	Guard Shack	1985	Cold War	Not Evaluated
987	Ordnance Facility	1976	Vietnam Era	Not 50 years old
1696	Exch Svc Outlet	Unknown	None	Not eligible
1700	Outdoor Recreation Mall	2003	Modern	N/A

Key: N/A = not applicable

Notes:

¹ Source: (Navy, 2012)

² Depending on build date, could be covered by the World War II and Cold War Era Ammunition Storage Facilities Program Comment (Advisory Council on Historic Preservation, 2006a).

Traditional Cultural Properties

There are no known traditional cultural properties present at JB CHS-WS. As a result, the Navy is compliant with Department of Defense Instruction 4710.02, and Secretary of the Navy Instruction 11010.14A.

3.5.3 Environmental Consequences

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the importance of the resource; introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting); or neglecting the resource to the extent that it deteriorates or is destroyed. In compliance with Section 106 of the NHPA, the Navy has completed consultation with the South Carolina Department of Archives and History, which acts as the SHPO (Appendix D, National Historic Preservation Act Section 106 Documentation). In a letter dated November 14, 2018, based on the description of the APE and the identification of historic properties within the APE, the SHPO concurred with the Navy's assessment that no properties listed in or eligible

for listing in the NRHP would be affected by this project (Appendix D, National Historic Preservation Act Section 106 Documentation).

3.5.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to cultural resources from existing conditions. Therefore, no significant impacts to cultural resources would occur with implementation of the No Action Alternative.

3.5.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

Under Alternative 1, the study area includes the clear zone that would enclose the NNPTC, NHCC, barracks, and associated parking areas, as well as the 0.25-mile viewshed.

Archaeological Resources

No effect to archaeological resources would be anticipated. As described in Section 3.5.2 (Affected Environment, Archaeological Resources), there are no known NRHP-listed or NRHP-eligible archaeological resources within the APE for ground-disturbing activities. Therefore, implementation of Alternative 1 would not result in significant impacts to cultural resources.

Implementation of Alternative 1 would not be expected to result in the discovery of unanticipated archaeological resources. However, in the event of an inadvertent discovery of previously unrecorded or unevaluated cultural resources during construction, the Navy will manage these resources in accordance with the NHPA and other federal and state laws, Navy and DoD regulations and instructions, and DoD American Indian and Alaska Native Policy by implementing the Standard Operating Procedure for Cultural Discoveries, of the ICRMP, which contains procedures for inadvertent discovery of archaeological materials and for human remains (U.S. Air Force, 2018b).

Architectural Resources

Alternative 1 would have no effect on historic buildings and structures. There are no known NRHP-listed or NRHP-eligible historic buildings or structures located within the APE, including the potential viewshed of the proposed fence line. Although there are three buildings outside the NNPTC complex within 0.25 mile of the proposed clear zone that have not been evaluated, the existing forest vegetation between the proposed clear zone and the buildings would obscure any clear view of the proposed fence from any of the buildings. Based on the description of the APE and the identification of historic properties within the APE, the SHPO concurs with the assessment that no historic properties listed in or eligible for listing in the NRHP would be affected (Appendix D, National Historic Preservation Act Documentation). Therefore, there would be no effect on historic buildings and structures that are potentially eligible for listing in the NRHP.

Traditional Cultural Properties

The ICRMP reports that use of the Native American Consultation Database, as of January 2011, indicated that there are no federally recognized Native American tribes with land claims in Berkeley and Charleston Counties (U.S. Air Force, 2018b). The ICRMP, however, cites the DoD *Desktop Guide for Native American Consultation* (2007) and identified the Catawba Indian Nation as a potentially affiliated tribe. The Navy conducted government-to-government coordination with the Catawba Indian Nation. In a letter dated June 21, 2019, the Catawba Indian Nation had no immediate concerns with regard to

traditional cultural properties, sacred sites, or Native American archaeological sites within the proposed project area (Appendix E, Tribal Government-to-Government Documentation).

3.5.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The fence alignment under Alternative 2 would be the same as Alternative 1; however, streams and wetland areas would be crossed using a low water crossing methodology. The APE for ground disturbance would be the same as Alternative 1 at 14.90 acres. Impacts to archaeological resources, architectural resources, and traditional cultural properties would be the same as for Alternative 1. Alternative 2 would have no effect on historic properties. Therefore, implementation of Alternative 2 would not result in significant impacts to cultural resources.

3.5.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

Under Alternative 3, the fence alignment would be the same as Alternative 1; however, the patrol road would not be continuous and the clear zone would be reduced to 20-feet wide in areas of stream and wetland crossings. Therefore, the APE for ground disturbance would be smaller at 10.95 acres. Impacts to archaeological resources, architectural resources, and traditional cultural properties would be the same as for Alternative 1. Alternative 3 would have no effect on historic properties. Therefore, implementation of Alternative 3 would not result in significant impacts to cultural resources.

3.5.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

Under Alternative 4, the fence alignment would be the same as Alternative 1 except the student parking area would not be enclosed. This alternative would also require an additional access road (0.34 acre) and a minimum of two more pedestrian gates. The APE for ground disturbance would consist of 15.71 acres (Figure 2-3). Impacts to archaeological resources, architectural resources, and traditional cultural properties would be the same as for Alternative 1. Alternative 4 would have no effect on historic properties. Therefore, implementation of this action alternative would not result in significant impacts to cultural resources.

3.6 Infrastructure

This section discusses infrastructure including utilities (energy, stormwater management, solid waste management) and communications.

3.6.1 Regulatory Setting

Antiterrorism Force Protection Standards have been adopted by the DoD. The standards require all DoD Components to adopt and adhere to common criteria and minimum construction standards to mitigate antiterrorism vulnerabilities and terrorist threats.

3.6.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under infrastructure at JB CHS-WS. Figure 3-6 shows the locations of the electric, natural gas, and water utilities.



Notes: Red = electric; Yellow = natural gas; Blue = potable water

Figure 3-6 Utilities at JB CHS-WS

Energy

South Carolina Electric and Gas Company supplies electrical power and natural gas to the base. The primary electric feeder line runs parallel to Red Bank Road and connects to the distribution system at the main substation. Principal feeder lines originate at the substation and distribute power throughout the base via a series of overhead lines and wooden poles (Navy, 2007). There are both overhead and underground systems present. There are a total of three electrical entry points into JB CHS-WS (U.S. Air Force, 2018a). The first line is supplied via a 115 kilovolt line located at the northern end of JB CHS-WS, which is the primary source of power, with one 10.5 megavolt ampere (MVA) substation and nine feeders. The second entry point is located at the southern end of JB CHS-WS at Remount Road, which has one 10.5 MVA substation and two feeders. The third electrical entry point is adjacent to Pier Bravo with two 22.5 MVA substations and five feeders.

All street lighting is owned and maintained by the Air Force. The types used are cobra-head styles on wooden power distribution poles in overhead electric service areas and cobra-head or pedestal type on

aluminum poles in underground-fed areas (Navy, 2007). A natural gas trunk line is located at the intersection of Red Bank Road and North Rhett Avenue (Navy, 2007).

Stormwater

In the State of South Carolina, the NPDES permit program is administered by the SCDHEC. The current NPDES South Carolina Industrial General Permit (SCR000000) became effective on October 1, 2016, and expires on September 30, 2021. JB CHS-WS maintains a Municipal Separate Storm Sewer System permit (SCR031504) for regulated industrial discharges by outfalls located in the Back River, Cooper River, Foster Creek, and Goose Creek (U.S. Air Force, 2018). A SWPPP has been prepared and reviewed in 2018 (Evans, 2019).

Solid Waste Management

Solid waste storage and collection at JB CHS is primarily the responsibility of the 628th Civil Engineer Squadron/Operations Flight (628 CES/CEO) who contracts these activities. The 628 CES/CEO administers and oversees all aspects of the contractor's performance and collects excess property for re-use from all areas of the base. The 628 CES/CEO and 628th Civil Engineer Squadron/Installation Management Flight/Environmental Element (628 CES/CEIE) requires tracking of the amount of waste hauled away from the base. Recycled material is tracked by type, weight, and income from, or cost for, recycling. Construction and demolition waste is recycled, when possible with a diversion rate of 45 percent. The contractor uses the Bees Ferry landfill and the Berkeley County Water and Sanitation Authority landfill, both in Berkeley County (U.S. Air Force, 2018c). The Bees Ferry landfill is 312 acres and is permitted as a Subtitle D facility to accept 180,000 tons of solid waste per year. This landfill does not accept construction and demolition waste (Charleston County, 2019). It has capacity to accept waste for another 27 years (U.S. Air Force, 2018c) using existing permitted space. The Berkeley County Water and Sanitation landfill occupies 195 acres in southern Berkeley County and is permitted as a Subtitle D facility to accept up to 1,000,000 tons of solid waste per year. This landfill has capacity to accept waste for another 20 years using existing permitted space (U.S. Air Force, 2018c).

Communications

Communications equipment at JB CHS-WS includes transmitters, antennas, receivers, satellite communications equipment, commercial cell towers, closed circuit camera system, Combat Service Support Automated Information Systems Interface tag readers, and radar, much of which is a result of the Space and Naval Warfare Systems Command and its mission (U.S. Air Force, 2018a). The communications system at JB CHS-WS supports the NNPTC and NHCC.

The copper cable plant servicing the majority of JB CHS-WS is owned and maintained by AT&T per contract (U.S. Air Force, 2018a). Navy Marine Corps Intranet (NMCI) has installed fiber, and since joint basing, the Air Force and NMCI have worked together and share existing fiber maintained under the operations and maintenance contract.

Telephone is supplied by AT&T. The supplier owns and maintains the system. The main communication trunk line is located along Red Bank Road (Navy, 2007). There are both overhead and underground systems present.

3.6.3 Environmental Consequences

This section analyzes the magnitude of anticipated increases or decreases in public works infrastructure demands considering historic levels, existing management practices, and storage capacity, and evaluates

potential impacts to public works infrastructure associated with implementation of the alternatives. Impacts are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, or require development of facilities and sources beyond those existing or currently planned.

3.6.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to the existing infrastructure of JB CHS-WS. A fence and clear zone to assist with mitigation of some antiterrorism vulnerabilities and terrorist threats would not occur. Therefore, existing conditions would be maintained and no significant impacts to utilities would occur with implementation of the No Action Alternative.

3.6.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area encompasses the proposed ground disturbance areas related to constructing and maintaining a fence, patrol road, gates, and lighting along the proposed alignment shown.

During construction, there would be a temporary increase in the number of workers at the base using water, electric, and gas and generating wastewater and solid waste. After construction, there would be a slight increase in the need for electricity for lighting. However, light-emitting diode lights would be used to assist with lowering energy use. Alternative 1 would not permanently increase, decrease, or otherwise change demand for utilities as no additional personnel would be assigned to the base for the fence and clear zone project. No changes are proposed to the existing stormwater outfalls.

Alternative 1 would have a beneficial impact on infrastructure and utilities because the fence and clear zone would lessen antiterrorism vulnerabilities and terrorist threats to base infrastructure. Therefore, implementation of the Preferred Alternative would not result in significant impacts to infrastructure.

3.6.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for infrastructure under Alternative 2 is the same as Alternative 1. As a result, infrastructure impacts under Alternative 2 would be the same as Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to infrastructure.

3.6.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area under Alternative 3 would be similar to Alternative 1. Impacts to infrastructure would be similar to Alternative 1. An Antiterrorism Force Protection waiver would be required for not maintaining the 50-foot clear zone. Implementation of this action alternative would not result in significant impacts to infrastructure.

3.6.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for Alternative 4 would be similar to Alternative 1. However, the student parking area would not be enclosed and would require alternative methods of providing security such as additional patrol personnel and construction of guard shacks. This alternative would result in annual costs being incurred. Implementation of this alternative would likely be more costly, but not result in significant impacts to infrastructure.

3.7 Air Quality

This discussion of air quality includes criteria pollutants, standards, sources, permitting, and greenhouse gases (GHGs). Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.7.1 Regulatory Setting

Criteria Pollutants and National Ambient Air Quality Standards

The principal pollutants defining air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone, suspended particulate matter less than or equal to 10 microns in diameter (PM₁₀), fine particulate matter less than or equal to 2.5 microns in diameter (PM_{2.5}), and lead (Pb). CO, SO₂, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone, NO₂, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes.

Under the Clean Air Act (CAA), the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] part 50) for these pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to USEPA for approval.

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments. The *National Emission Standards for Hazardous Air Pollutants* regulate HAP emissions from stationary sources (40 CFR part 61).

General Conformity

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a

conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

A conformity applicability analysis is the first step of a conformity evaluation and assesses if a federal action must be supported by a conformity determination. This is typically done by quantifying applicable direct and indirect emissions that are projected to result due to implementation of the federal action. Indirect emissions are those emissions caused by the federal action and originating in the region of interest, but which can occur at a later time or in a different location from the action itself and are reasonably foreseeable. The federal agency can control and will maintain control over the indirect action due to a continuing program responsibility of the federal agency. Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity evaluation is performed. The location of such emissions is known and the emissions are quantifiable, as described and documented by the federal agency based on its own information and after reviewing any information presented to the federal agency. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions thresholds, then the conformity evaluation process is completed. *De minimis* threshold emissions are presented in Table 3-9.

Table 3-9 General Conformity *de minimis* Levels

Pollutant	Area Type	tpy
Ozone (VOC or NO _x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO _x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
Carbon monoxide, SO ₂ , and NO ₂	All nonattainment and maintenance	100
PM ₁₀	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
PM _{2.5} Direct emissions, SO ₂ , NO _x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	Serious nonattainment	70
	Moderate nonattainment	100
Lead (Pb)	All nonattainment and maintenance	25

Key: NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter less than 10 or 2.5 microns in diameter, respectively; SO₂ = sulfur dioxide; tpy = tons per year; VOC = volatile organic compounds

Permitting

The Title V Operating Permit Program consolidates all CAA requirements applicable to the operation of a source, including requirements from the SIP, preconstruction permits, and the air toxics program. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds, as well as other non-major sources specified in a particular regulation. The program includes

a requirement for payment of permit fees to finance the operating permit program whether implemented by USEPA or a state or local regulator. Navy installations subject to Title V permitting shall comply with the requirements of the Title V Operating Permit Program, which are detailed in 40 CFR part 70 and all specific requirements contained in their individual permits.

Greenhouse Gases

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

Revised draft guidance from the Council on Environmental Quality, dated December 18, 2014, recommends that agencies consider both the potential effects of a Proposed Action on climate change, as indicated by its estimated GHG emissions, and the implications of climate change for the environmental effects of a Proposed Action. The guidance also emphasizes that agency analyses should be commensurate with projected GHG emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigations. It recommends that agencies consider 25,000 metric tons of carbon dioxide equivalent (CO₂e) emissions on an annual basis as a reference point below which a quantitative analysis of GHG is not recommended unless it is easily accomplished based on available tools and data.

USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009. GHGs covered under the *Final Mandatory Reporting of Greenhouse Gases Rule* are carbon dioxide (CO₂), methane, nitrogen oxides (NO_x), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO₂, which has a value of one. The equivalent CO₂ rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO₂e are required to submit annual reports to USEPA.

GHG emissions are also regulated under PSD and Title V permitting programs, which were initiated by a USEPA rulemaking issued on June 3, 2010, known as the GHG Tailoring Rule (75 Federal Register 31514). GHG emissions thresholds for permitting of stationary sources are an increase of 75,000 tpy of CO₂e at existing major sources and facility-wide emissions of 100,000 tpy of CO₂e for a new source or a modification of an existing minor source. The 100,000 tpy of CO₂e threshold defines a major GHG source for both construction (PSD) and operating (Title V) permitting, respectively. However on June 23, 2014, the U.S. Supreme Court issued its decision in *Utility Air Regulatory Group v. USEPA* (No. 12-1146). As a result of the decision USEPA will no longer apply or enforce federal regulatory provisions or the USEPA approved PSD SIP provisions that require a stationary source to obtain a PSD permit if GHGs are the only pollutant that the source emits or has the potential to emit above the major source thresholds, or for which there is a significant emissions increase and a significant net emissions increase from a modification (e.g., 40 CFR section 52.21 (b)(49)(v)). Nor does USEPA intend to continue applying

regulations that would require that states include in their SIP a requirement that such sources obtain PSD permits.

Similarly, USEPA will no longer apply or enforce federal regulatory provisions or provisions of the USEPA approved Title V programs that require a stationary source to obtain a Title V permit solely because the source emits or has the potential to emit GHGs above the major source thresholds (e.g., the regulatory provision relating to GHG subject to regulation in 40 CFR section 71.2). USEPA also does not intend to continue applying regulations that would require Title V programs submitted for approval by USEPA to require that such sources obtain Title V permits.

EO 13834, *Efficient Federal Operations*, of May 17, 2018, revoked EO 13693, *Planning for Federal Sustainability in the Next Decade*, and establishes the goal to prioritize actions that reduce waste, cut costs, enhance the resilience of federal infrastructure and operations, and enable more effective accomplishment of an agency's mission. While the new EO 13834 does not quantify any reduction targets and agencies have not yet developed performance metrics, the DoD retains a target of 25 percent renewables of all energy consumed by 2025 as identified in Public Law 109-364, Division B, Title XXVIII, Subtitle E, Section 2852, but does not define any interim targets as previously identified in EO 13693.

In an effort to reduce energy consumption, reduce GHGs, reduce dependence on petroleum, and increase the use of renewable energy resources, the Navy has implemented a number of renewable energy projects. The Navy has established Fiscal Year 2020 GHG emissions reduction targets of 34 percent from a Fiscal Year 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions. Examples of Navy-wide GHG reduction projects include energy efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. The Navy continues to promote and install new renewable energy projects.

3.7.2 Affected Environment

JB CHS-WS is located in both Berkeley and Charleston Counties, South Carolina, which are within the Charleston Intrastate Air Quality Control Region (AQCR) 199. The Charleston Interstate AQCR also includes Dorchester County in South Carolina (40 CFR 81.112). All portions of the Charleston AQCR are in attainment for all criteria pollutants (USEPA, 2019d). According to 40 CFR part 81, the nearest Class I area is the Cape Romain National Wildlife Refuge, which is greater than 10 kilometers from JB CHS-WS (USFWS, 2016).

The most recent emissions for Berkeley and Charleston Counties and the Charleston Intrastate AQCR are shown in Table 3-10. Berkeley and Charleston Counties are considered the local area of influence, and the Charleston Intrastate AQCR is considered the regional area of influence for this air quality analysis. Ozone is not a direct emission; rather, it is generated from reactions of VOCs and NO_x, which are precursors to ozone. Therefore, for the purposes of this air quality analysis, VOCs and NO_x emissions are used to represent ozone generation.

The SCDHEC regulates air quality for the State of South Carolina. JB CHS-WS is classified as a conditional major air emissions source with the SCDHEC. There are various sources on-base that emit criteria pollutants and HAPs, including generators, boilers, hot water heaters, space heaters, and paint booths.

Table 3-10 Joint Base Charleston – Air Basin Air Emissions Inventory (2014 National Emissions Inventory)

<i>Location</i>	<i>NO_x</i> <i>(tpy)</i>	<i>VOC</i> <i>(tpy)</i>	<i>CO</i> <i>(tpy)</i>	<i>SO₂</i> <i>(tpy)</i>	<i>PM₁₀</i> <i>(tpy)</i>	<i>PM_{2.5}</i> <i>(tpy)</i>
Berkeley County	126,351	12,231	10,425	5,898	12,308	54,223
Charleston County	83,839	16,486	7,402	3,520	2,187	45,603
ROI Total	210,190	28,717	17,827	9,418	14,495	99,826
Charleston Intrastate AQCR	243,253	34,434	21,588	10,852	15,784	127,213

Source: (USEPA, 2019c)

Key: AQCR = Air Quality Control Region; CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ or PM_{2.5} = particulate matter less than 10 or 2.5 microns in diameter, respectively; ROI = region of influence; SO₂ = sulfur dioxide; tpy = tons per year; VOC = volatile organic compounds

3.7.3 Environmental Consequences

Effects on air quality were based on estimated direct and indirect emissions associated with the action alternatives. In order to present a conservative analysis, emissions impacts were evaluated against the ROI emissions only (Berkeley and Charleston Counties), which is a much smaller area than the Charleston Interstate AQCR.

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations. A description of the emissions calculations methods and formulas are provided in Appendix G, Air Quality Methodology and Calculations.

3.7.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to baseline air quality. Therefore, no significant impacts to air quality or air resources would occur with implementation of the No Action Alternative.

3.7.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

Under Alternative 1, construction of a chain-link perimeter security fence and patrol road would enclose the NNPTC, NHCC, barracks, and associated parking areas. This alternative would include 2.47 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 14.90 acres.

Air quality impacts under Alternative 1 would be temporary and consist of fugitive dust and fossil fuel combustion emissions during construction and post-construction during fence line operations and maintenance. The study area includes the extended locale, to include Berkeley and Charleston Counties, where the air quality impacts could occur.

Table 3-11 lists estimated criteria pollutant emissions for construction under Alternative 1. Emissions would be minimal, with the highest percentage (other than for PM₁₀) being 0.03 percent for NO_x over ROI baseline emissions. PM₁₀ emissions were estimated at only 0.45 percent, and this figure is additionally conservative as the entire project area would not require complete clearing and grading, and emissions could be further mitigated through use of BMPs such as spraying with water and covering of haul loads. Therefore, implementation of Alternative 1 would not result in significant impacts to air quality.

Emissions would also be generated from security patrols and clear zone maintenance operations. It was assumed that security patrols of the entire perimeter would be conducted twice each day using a golf cart or small vehicle. Emissions were calculated for the small vehicle in order to provide a conservative approach. For maintenance operations, it was assumed that the area would be mowed once each month for six months using a tractor pulling a 12-foot-wide batwing mower. Criteria pollutant emissions would be extremely minor, amounting to 17.28 pounds annually (0.01 tons per year) for all pollutants. Detailed calculations are provided in Appendix G. Emissions from operations would not significantly impact air quality.

Table 3-11 Alternative 1 Criteria Pollutant Emissions

<i>Emissions</i>	<i>CO</i>	<i>NO_x</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>SO₂</i>	<i>VOCs</i>
Construction emissions (tpy)	7.415	8.554	80.646	0.363	0.020	1.318
ROI baseline emissions (tpy)	210,190	28,717	17,827	9,418	14,495	99,826
Percentage of ROI emissions	0.00%	0.03%	0.45%	0.00%	0.00%	0.00%

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; ROI = region of influence; SO₂ = sulfur dioxide; tpy = tons per year; VOCs = volatile organic compounds

General Conformity

Because the entire ROI (Berkeley and Charleston Counties) is considered to be in attainment for all criteria pollutants (USEPA, 2019e), a general conformity analysis was not required.

Greenhouse Gases

Implementation of Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Clearing and construction would generate approximately 1,914 tons (1,736 metric tons) of CO₂e if the proposed construction occurred within one year. This limited amount of emissions would not likely contribute to global warming to any discernible extent. End-state operational emissions from patrols and maintenance activities would be 0.75 tons annually and would therefore be extremely minor and insignificant.

3.7.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The fence alignment under Alternative 2 would be the same as Alternative 1; however, wetland areas and ditches would be crossed using a low water crossing; therefore, the patrol road would not be elevated and no culverts would be installed. However, the size and scope of the project would be the same as under Alternative 1. Therefore, the air quality impacts would be the same as described for Alternative 1. Similar to Alternative 1, Alternative 2 would not result in significant impacts to air quality.

3.7.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

Under Alternative 3, the fence alignment would be similar to Alternative 1; however, the perimeter patrol road would be only 0.71 mile instead of following the entire 2.47-mile fence line.

Similar to Alternative 1, air quality impacts under Alternative 3 would be temporary and consist of fugitive dust and fossil fuel combustion emissions during construction and post-construction during fence line operations and maintenance. Table 3-12 lists estimated criteria pollutant emissions for construction under Alternative 3. Emissions would be minimal, with the highest percentage (other than

for PM₁₀) being 0.03 percent for nitrogen oxides over ROI baseline emissions. PM₁₀ emissions were estimated at only 0.04 percent, and additionally this figure is conservative as the entire project area would not require complete clearing and grading and emissions could be further mitigated through use of BMPs such as spraying with water and covering of haul loads.

Therefore, implementation of Alternative 3 would not result in significant impacts to air quality. The entire ROI is in attainment for all criteria pollutants (USEPA, 2019e); therefore, a general conformity analysis was not required. Implementation of Alternative 3 would contribute directly to emissions of GHGs from the combustion of fossil fuels; however, the limited amount of emissions would not likely contribute to global warming to any discernible extent.

Table 3-12 Alternative 3 Criteria Pollutant Emissions

<i>Emissions</i>	<i>CO</i>	<i>NO_x</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>SO₂</i>	<i>VOCs</i>
Construction emissions (tpy)	6.196	7.373	7.846	0.309	0.017	1.137
ROI baseline emissions (tpy)	210,190	28,717	17,827	9,418	14,495	99,826
Percentage of ROI emissions	0.00%	0.03%	0.04%	0.00%	0.00%	0.00%

Key: CO = carbon monoxide; NO_x = nitrogen oxide; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; ROI = region of influence; SO₂ = sulfur dioxide; tpy = tons per year; VOC = volatile organic compound

Emissions would also be generated from security patrols and clear zone maintenance operations. It was assumed that security patrols of the entire perimeter would be conducted twice each day using a golf cart or small vehicle. Emissions were calculated for the small vehicle in order to provide a conservative approach. For maintenance operations, it was assumed that the area would be mowed once each month for six months using a tractor pulling a 12-foot-wide batwing mower. Criteria pollutant emissions would be extremely minor, amounting to 9.40 pounds annually for all pollutants. Detailed calculations are provided in Appendix G. Emissions from operations would not significantly impact air quality.

Greenhouse Gases

Implementation of Alternative 3 would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels. Clearing and construction would generate approximately 1,661 tons (1,507 metric tons) of carbon dioxide equivalent if the proposed construction occurred within one year. This limited amount of emissions would not likely contribute to global warming to any discernible extent.

End-state operational emissions from patrols and maintenance activities would be less than one-quarter of 1 ton annually and would therefore be extremely minor and insignificant.

3.7.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

Under Alternative 4, the fence alignment would be similar to Alternative 1 except the student parking area would not be enclosed. This alternative would include 2.56 miles of fencing and patrol road. Total temporary and permanent disturbance would consist of 15.71 acres.

Similar to Alternative 1, air quality impacts under Alternative 4 would be temporary and consist of fugitive dust and fossil fuel combustion emissions during construction and post-construction during fence line operations and maintenance. Table 3-13 lists estimated criteria pollutant emissions for

construction under Alternative 4. Emissions would be minimal, with the highest percentage (other than for PM₁₀) being 0.03 percent for NO_x over ROI baseline emissions. PM₁₀ emissions were estimated at only 0.5 percent, and additionally this figure is conservative as the entire project area would not require complete clearing and grading, and emissions could be further mitigated through use of BMPs such as spraying with water and covering of haul loads. The entire ROI is in attainment for all criteria pollutants (USEPA, 2019e); therefore, a general conformity analysis was not required. Implementation of Alternative 4 would contribute directly to emissions of GHGs from the combustion of fossil fuels; however, the limited amount of emissions would not likely contribute to global warming to any discernible extent. Therefore, implementation of Alternative 4 would not result in significant impacts to air quality.

Table 3-13 Alternative 4 Criteria Pollutant Emissions

<i>Emissions</i>	<i>CO</i>	<i>NO_x</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>SO₂</i>	<i>VOCs</i>
Construction emissions (tpy)	7.416	8.557	88.999	0.363	0.02	1.318
ROI baseline emissions (tpy)	210,190	28,717	17,827	9,418	14,495	99,826
<i>Percentage of ROI emissions</i>	<i>0.00%</i>	<i>0.03%</i>	<i>0.50%</i>	<i>0.00%</i>	<i>0.00%</i>	<i>0.00%</i>

Key: CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; ROI = region of influence; SO₂ = sulfur dioxide; tpy = tons per year; VOCs = volatile organic compounds

Emissions would also be generated from security patrols and clear zone maintenance operations. It was assumed that security patrols of the entire perimeter would be conducted twice each day using a golf cart or small vehicle. Emissions were calculated for the small vehicle in order to provide a conservative approach. For maintenance operations, it was assumed that the area would be mowed once each month for six months using a tractor pulling a 12-foot-wide batwing mower. Criteria pollutant emissions would be extremely minor, amounting to 17.92 pounds annually (0.01 tons per year) for all pollutants. Detailed calculations are provided in Appendix G. Emissions from operations would not significantly impact air quality.

Greenhouse Gases

Implementation of Alternative 4 would contribute directly to emissions of greenhouse gases from the combustion of fossil fuels. Clearing and construction would generate approximately 1,915 tons (1,737 metric tons) of carbon dioxide equivalent if the proposed construction occurred within one year. This limited amount of emissions would not likely contribute to global warming to any discernible extent.

End-state operational emissions from patrols and maintenance activities would be less than one-tenth of 1 ton annually and would therefore be extremely minor and insignificant.

3.8 Noise

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency – the number of cycles per second the air vibrates, in hertz
- Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

3.8.1 Basics of Sound and A-Weighted Sound Level

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The decibel is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's nonlinear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. In this document, the dB unit refers to A-weighted sound levels. Table 3-14 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Figure 3-7 (Cowan, 1994) provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioners, vacuum cleaners) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobiles, heavy trucks) are the maximum sound produced during an event like a vehicle passing by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Table 3-14 Subjective Responses to Changes in A-Weighted Decibels

<i>Change</i>	<i>Change in Perceived Loudness</i>
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Key: dB = decibels

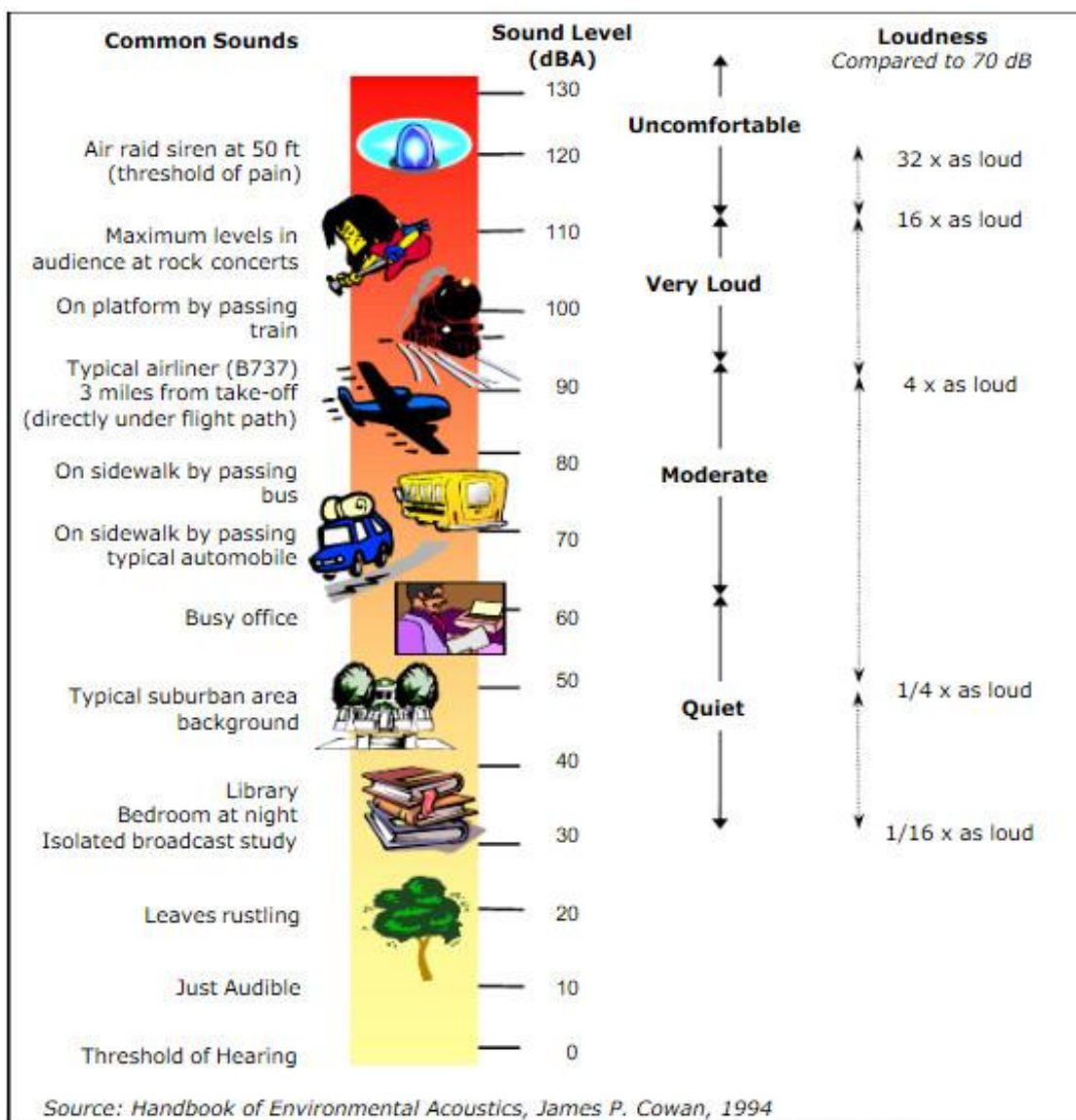


Figure 3-7 A-Weighted Sound Levels from Typical Sources

3.8.2 Noise Metrics

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EA are summarized below.

Day-Night Average Sound Level

The day-night average sound level (DNL) metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific

information on the number of noise events or the individual sound levels that occur during the 24-hour day. DNL is the standard noise metric used by the U.S. Department of Housing and Urban Development, Federal Aviation Administration, USEPA, and DoD. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments; there is a consistent relationship between DNL and the level of annoyance. Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis.

Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Urban Noise, 1980).

3.8.3 Noise Effects

An extensive amount of research has been conducted regarding noise effects, including annoyance, speech interference, sleep disturbance, noise-induced hearing impairment, nonauditory health effects, performance effects, noise effects on children, effects on domestic animals and wildlife, property values, structures, terrain, and archaeological sites. The effects pertaining to the analysis of this Proposed Action (i.e., annoyance and workplace noise) are summarized below.

Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 A-weighted decibels (dBA) as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss. Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998, which reaffirmed the 85 dB recommended exposure limit (National Institute for Occupational Health and Safety, 1998).

3.8.4 Regulatory Setting

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

3.8.5 Affected Environment

The predominant noise sources at JB CHS-WS consist of ground transportation and vehicle traffic, construction, and commercial/industrial noise. The federal government supports conditions free from noise that threaten human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise-sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species.

Noise-sensitive locations near the project area include a military residential area and elementary and middle schools to the northwest as well as outdoor recreation facilities. The area surrounding the project area to the north, northeast, and east is relatively secluded and primarily consists of wooded area. However, this area is used for outdoor recreation and contains a network of multi-use trails. To the south there are scattered commercial/industrial facilities interspersed between open or wooded areas. The closest noise-sensitive location to the proposed perimeter fence clear zone (Marrington Middle School of the Arts) is approximately 350 feet away.

3.8.6 Environmental Consequences

Analysis of potential noise impacts includes estimating likely noise levels from the Proposed Action and determining potential effects to sensitive receptor sites.

3.8.6.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to baseline noise levels. Therefore, no significant impacts due to the noise environment would occur with implementation of the No Action Alternative.

3.8.6.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

Construction would generate localized, temporary noise. Construction would occur during normal working hours (i.e., 7:00 a.m. to 5:00 p.m. Monday through Friday). No pile driving would be required during construction and post-construction during fence line operations and maintenance. Workers would wear hearing protection, as required, in accordance with applicable laws and regulations. Marrington Elementary and Middle schools and the military residences to the northwest would experience relatively short periods of time in which noise levels would be elevated due to construction crews operating nearby. Because the fence and patrol road are linear construction projects, construction at any given location along the fence would be brief. Approximately 400 linear feet of fence would be installed per day, although that rate would vary based on specific terrain and conditions. The closest military residences to the proposed project, which are located along Sunbird and Gearing Streets, are approximately 900 feet from the proposed fence. However, Marrington Elementary School is approximately 700 feet from the closest portion of proposed perimeter fence and Marrington Middle School of the Arts is 350 feet away. Maximum noise levels generated by a backhoe and dump truck at a distance of 80 feet (assuming outdoor physical education) are 74 and 72 dBA, respectively. During a hypothetical day on which these two types of construction equipment are used over an entire work day at 80 feet from a sensitive noise receptor, the construction noise level at the receptor would be 72 dBA DNL (FHWA, 2006). Construction equipment noise would be lower at greater distances. Construction noise would be limited to normal working hours, and potential impacts at the closest military residences would be limited to annoyance. The proposed construction noise would only add minimally to overall noise levels at noise-sensitive locations. Most of the area immediately adjacent to the proposed fence is either open/wooded area or is used for non-noise-sensitive activities such as commercial/industrial activities.

In conclusion, construction noise at any given location would be temporary and limited to normal working hours. At a given receptor location such as the nearby schools, the construction would only be ongoing in the immediately adjacent area for a short period of time as the construction would be

completed linearly and would move on to another area within days or weeks. Therefore, implementation of Alternative 1 would not result in significant impacts to the noise environment.

3.8.6.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The fence alignment under Alternative 2 would be the same as Alternative 1, but wetland areas would be low water crossings and no culverts would be installed. Under Alternative 2, noise impacts would be similar to Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to the noise environment.

3.8.6.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The fence alignment under Alternative 3 would be similar to Alternative 1; however, the patrol road would not be continuous, as wetland and stream areas would be avoided. Under Alternative 3, noise impacts would be similar to Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to the noise environment.

3.8.6.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The fence alignment for Alternative 4 would be similar to Alternative 1 except the student parking area would not be enclosed. However, there are no sensitive receptors in that student parking area. Impacts to the sensitive receptors such as the schools, residences, and outdoor recreational facilities would remain the same and would again be temporary and minor. Therefore, implementation of this action alternative would not result in significant impacts to the noise environment.

3.9 Public Health and Safety

This discussion of public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. The primary goal is to identify and prevent potential accidents or impacts on the general public. Public health and safety within this EA discusses information pertaining to construction and security.

Public health and safety during construction is generally associated with construction traffic, as well as the safety of personnel within or adjacent to the construction zones.

3.9.1 Regulatory Setting

3.9.2 Affected Environment

Construction contractors will be required to follow OSHA safety regulations and not pose risk to workers. Contractor responsibilities are to review potentially hazardous workplace operations; monitor exposure to workplace chemicals, physical hazards, and potentially hazardous wildlife and plants; recommend and evaluate controls to ensure personnel are properly protected or unexposed; and provide a medical monitoring program, as needed.

3.9.3 Environmental Consequences

The safety and environmental health analysis addressed issues related to the health and well-being of military personnel and civilians living on or in the vicinity of JB CHS-WS. Specifically, this section provides information on construction, physical security, and meeting Antiterrorism Force Protection standards.

3.9.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; no fence and clear zone would be constructed, and resulting health and safety improvements would not occur. The No Action Alternative would maintain current conditions and would not pose any beneficial impacts to public health and safety.

3.9.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

Under Alternative 1, a fence to secure the base would be constructed and would be a benefit to public health and safety both in terms of limiting unauthorized access by casual intruders and preventing sabotage. Alternative 1 would meet Antiterrorism Force Protection standards without a waiver and would not result in a significant impact to public health and safety, considering the beneficial impacts of improved security. During construction, there would be a short-term increase in the number of workers, traffic, and noise in the construction zone. These temporary impacts would not result in a significant impact to public health and safety considering the beneficial impacts of improved security.

3.9.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

Similar to Alternative 1, under Alternative 2, a fence to secure the base would be a benefit to public health and safety by preventing unauthorized access by casual intruders and preventing sabotage. After project completion, the low water crossings may not be accessible during rain and storm events. Signs would need to be posted to avoid crossing the wetland and stream areas due to high water levels and to ensure the protection of security patrols. Signs would reduce potential safety impacts during rain and storm events; therefore, Alternative 2 would not result in a significant impact to public health and safety considering the beneficial impacts of improved security. During construction, there would be a short-term increase in the number of workers, traffic, and noise in the construction zone. The temporary construction impacts would not result in a significant impact to public health and safety considering the beneficial impacts of improved security.

3.9.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

Similar to Alternative 1, under Alternative 3, a fence to secure the base would be a benefit to public health and safety by preventing unauthorized access by casual intruders and preventing sabotage. Alternative 3 would not fully meet Antiterrorism Force Protection standards and a waiver would be required for the smaller clear zone and non-continuous patrol road. Patrols may not be able to access all areas due to the lack of a road in areas and alternative methods of patrolling would have to be conducted. Although, Alternative 3 would still include fencing, it would not be as protective of public health and safety as Alternative 1. This alternative, however, would still not result in significant impacts to public health and safety since security would still be improved. During construction, there would be a short-term increase in the number of workers, traffic, and noise in the construction zone. The temporary

construction impacts would not result in a significant impact to public health and safety considering the beneficial impacts of improved security.

3.9.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

Similar to Alternative 1, under Alternative 4, a fence to secure the base would be a benefit to public health and safety by preventing unauthorized access by casual intruders and preventing sabotage. Alternative security measures would be required to monitor the student parking areas since this area would not be fenced. Alternative forms of security would need to be provided by the Navy such as construction of guard shacks and staffing. Alternative 4 would not include fencing the student parking area; therefore, it would not be as protective of public health and safety as Alternative 1. This alternative, however, would still not result in significant impacts to public health and safety since security would still be improved. During construction, there would be a short-term increase in the number of workers, traffic, and noise in the construction zone. The temporary construction impacts would not result in a significant impact to public health and safety, considering the beneficial impacts of improved security.

3.10 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, toxic substances, and contaminated sites.

3.10.1 Regulatory Setting

Hazardous materials are defined by 49 CFR section 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions in 49 CFR part 173.” Transportation of hazardous materials is regulated by U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments, as: “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps, such as fluorescent light bulbs.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material, polychlorinated biphenyls, and lead-based paint. USEPA is given authority to regulate special hazard substances by the Toxic Substances Control Act. Asbestos is also regulated by USEPA under the CAA, and the Comprehensive Environmental Response, Compensation, and Liability Act.

Several Air Force regulations address the management and safe handling of hazardous materials and wastes in accordance with applicable federal and state regulations. These include:

- Air Force Instruction (AFI) 32-7086, Hazardous Material Management
- AFI 32-7042, Solid and Hazardous Waste Compliance
- AFI 32-1052, Facility Asbestos Management

The DoD established the Defense Environmental Restoration Program (DERP) to facilitate thorough investigation and cleanup of contaminated sites on military installations (active installations, installations subject to Base Realignment and Closure, and formerly used defense sites). The Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP) are components of the DERP. The IRP requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses non-operational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. The Environmental Restoration Program is the Navy's initiative to address DERP.

3.10.2 Affected Environment

Hazardous Materials

A variety of products containing hazardous materials are used by JB CHS as part of day-to-day operations. To administer these materials, JB CHS has implemented a comprehensive hazardous waste management process, including the use of a Hazardous Material Pharmacy (HAZMART). The HAZMART encompasses a storage facility and an established set of procedures designed to control the acquisition, storage, issue, and disposition of serviceable hazardous materials. Working in coordination with the Environmental Management, Bio-environmental, and Safety Offices, the HAZMART ensures that only approved products are purchased and stored, and that they are only issued to authorized users. In addition, the HAZMART helps minimize waste by ensuring residual materials are returned to use until the products are exhausted. Contractors conducting operations on the base are required to supply information to the base regarding any hazardous materials brought on JB CHS.

Hazardous Waste

JB CHS is regulated as a Large Quantity Generator of hazardous waste and maintains two USEPA Identification Numbers, one for the Air Base (SC3570024460) and one for the Weapons Station (SC8170022620). Hazardous waste at JB CHS-WS is primarily generated by base operations including transportation, army prepositioning activities, and other tenant activities including Space and Naval Warfare. Primary types of hazardous waste generated include paints, solvents, lubricants, corrosives, and refrigerants. In the latest Biennial Waste Report to USEPA, the Weapons Station reported generating 25.6 tons of hazardous waste in 2017 (USEPA, 2019a).

JB CHS has implemented a hazardous waste management plan that identifies hazardous waste generation areas and addresses the proper labeling, storage, and handling of these wastes, as well as record keeping, spill contingency and response requirements, and education and training of appropriate personnel.

All hazardous waste generated by contractors is handled and disposed of in accordance with federal, state, local, and Air Force regulations, with coordination of JB CHS' 628 CES for manifest signatures.

Special Hazards (Asbestos Containing Materials, Lead-Based Paint, Polychlorinated Biphenyls)

There are no buildings or other infrastructure present in the project area that would potentially contain special hazards that would be disturbed. Therefore, these hazards are not assessed further.

Defense Environmental Restoration Program

JB CHS has 293 IRP and MMRP sites. Sites requiring further action include inactive landfills, hardfills, inactive and active fire protection training areas, hazardous chemical and fuel spill sites, fuel and waste disposal sites, inactive and active hazardous waste storage areas, leaking aboveground and underground storage tanks or transfer systems, waste treatment facilities, munitions disposal sites, skeet ranges, and other active or operational sites (AECOM, 2018). JB CHS-WS has approximately 100 IRP sites with 57 requiring no further action and 44 undergoing RCRA corrective actions (U.S. Air Force, 2013). There are no active or inactive IRP or MMRP sites in the project area or vicinity (Table 3-15). All of the sites in the project area require no further action.

Table 3-15 Environmental Restoration Program Sites Located in the Project Area

<i>Site Name</i>	<i>Distance to the Project Area (miles)</i>	<i>Response Completion Date</i>	<i>Status</i>
SWMU 45 Southside Marrington Plantation	0.39 northwest	July 2000	NFA
SWMU 53 Southside Building 74 Container Repair	0.16 south	October 1998	NFA
SWMU 59 Southside Building 2308 Forestry Trailer	0.02 east	October 1998	NFA
SWMU 60A Southside Industrial Sanitary Sewer Lines	0.17 south	October 1998	NFA
SWMU 60B Southside Industrial Sanitary Sewer Lines	0.07 south	October 1998	NFA
SWMU 60C Southside Industrial Sanitary Sewer Lines	0.09 south	October 2003	NFA

Key: NFA = No further action; SWMU = Solid Waste Management Unit

Underground- and Above-Ground Storage Tanks

Based on the JB CHS-WS Environmental Restoration site location map, there are approximately 23 current and former underground storage tanks, aboveground storage tanks, and several septic tanks at JB CHS-WS. The closest underground storage tank to the project area is located 1.25 miles west of the project area.

3.10.3 Environmental Consequences

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at JB CHS-WS.

The qualitative and quantitative assessment of impacts from hazardous materials and wastes management focuses on how (context) and to what degree (intensity) each alternative could affect hazardous materials usage and management, hazardous waste generation and management, and hazardous waste disposal. Potential impacts associated with hazardous materials and wastes were analyzed for the following four effects:

- generation of hazardous material/waste types or quantities that could not be accommodated by the current management system
- increased likelihood of an uncontrolled release of hazardous materials that could contaminate the soil, surface water, groundwater, or air
- non-compliance with applicable federal and state regulations
- disturbance or creation of contaminated sites, resulting in adverse effects on human health and/or the environment

3.10.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to existing hazardous materials and wastes. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.10.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area for hazardous materials and wastes consists of the fence and clear zone construction area and vicinity (Figure 3-8).

Minor amounts of hazardous materials would be used during the construction of the perimeter fence, clear zone, and patrol road. These may include common materials such as fuels, paints, sealants, adhesives, etc. No unusual hazardous materials would be expected to be used. Generation of hazardous wastes, apart from leftover or used materials employed in the construction process, would not be expected. During fence and clear zone maintenance, herbicides could be used on an annual basis and spot treatments, as needed. All hazardous wastes will be managed in cooperation with the 628 CES and in accordance with all federal, state, and local regulations.

Alternative 1 would not exceed the hazardous waste management capacity or change the generator status of JB CHS. There would be a negligible potential for a release of fuels during construction from mobile refuelers or liquid fuel-powered equipment. In the unlikely event of a release, emergency services and the 628 CES will be notified and the base's Spill Prevention Control and Countermeasure Plan (U.S. Air Force, 2017) will be activated to respond to the spill.

Alternative 1 would be located outside of all Environmental Restoration Program and MMRP site boundaries. Alternative 1 would not disturb or create a contaminated site. If unexpected soil or water contamination is encountered during construction, construction will be halted and appropriate measures taken (remediation, land use controls, etc.) prior to project resumption. No known underground storage tanks are present in the project area; however, unknown tanks could be present

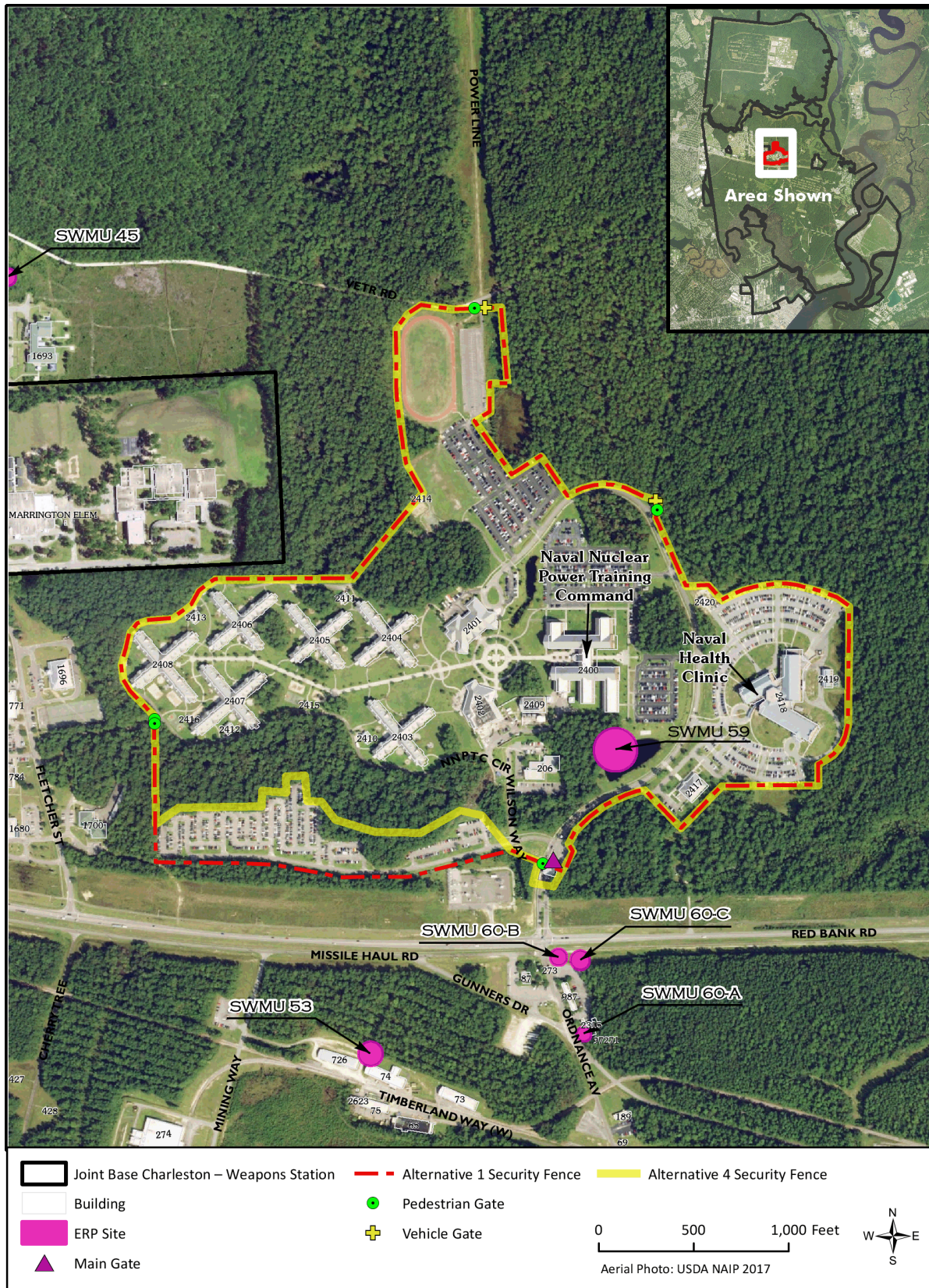


Figure 3-8 Locations of Environmental Restoration Program Sites

and discovered during construction. If a tank is discovered, the contractor will be required to stop work and contact the base Environmental Department for further instructions and proper handling in accordance with base policies and state and federal regulations. Therefore, implementation of Alternative 1 would not result in significant impacts to hazardous materials and wastes.

3.10.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

Impacts resulting from hazardous materials and wastes would be the same as those described for Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to hazardous materials and wastes.

3.10.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

Impacts resulting from hazardous materials and wastes would be the same as those described for Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to hazardous materials and wastes.

3.10.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

Impacts resulting from hazardous materials and wastes would be the same as those described for Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to hazardous materials and wastes.

3.11 Socioeconomics

This section discusses employment characteristics, economic activity, tax revenue, and related data providing key insights into the socioeconomic conditions that might be affected by the Proposed Action. There would be no new personnel associated with the Proposed Action that would result in a change in population, schools, and public services and therefore, these factors are not discussed in this section.

3.11.1 Regulatory Setting

Socioeconomic data shown in this section are presented at the U.S. Census Bureau Census Block Group, Census Tract, Metropolitan Statistical Area, county, state, and national levels, where applicable, to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. A Metropolitan Statistical Area is a geographic entity defined for use by federal statistical agencies based on the concept of a core urban area with a high degree of economic and social integration with surrounding communities. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., U.S. Bureau of Economic Analysis' Regional Economic Information System).

3.11.2 Affected Environment

The affected environment for socioeconomics includes the counties where the action alternatives would take place. JB CHS-WS is located in the City of North Charleston, which has incorporated areas in Berkeley, Charleston, and Dorchester Counties in South Carolina. The NNPTC and the NHCC are located at JB CHS-WS in Berkeley County. The affected environment for socioeconomic resources includes Berkeley, Charleston, and Dorchester Counties since the majority of socioeconomic impacts would be anticipated to occur within the tri-county area associated with JB CHS-WS.

Employment Characteristics

In 2017, there were a total of 478,810 jobs throughout the tri-county Charleston region (BEA, 2018). There were 78,039 jobs in Berkeley County with the largest proportion of jobs in the government and government enterprises industry (12.74 percent) followed by the retail trade industry (11.19 percent) and the professional, scientific, and technical services industry (10.85 percent). In Dorchester County there were 54,566 jobs with the largest proportion of jobs in the government and government enterprises industry (13.5 percent) followed by the retail trade industry (11.95 percent) and the manufacturing industry (9.54 percent). Charleston County had the largest number of jobs during 2017 with 346,205 jobs. The industry with the greatest number of jobs was the government and government enterprises industry (16.85 percent) followed by the accommodation and food services industry (10.6 percent) and the retail trade industry (9.65 percent) (BEA, 2018). Construction jobs accounted for 6.2 percent (29,832 jobs) of the total tri-county employment (BEA, 2018).

There are eight major military installations throughout South Carolina in addition to many other defense-related facilities which combined support approximately 62,520 DoD personnel making it the state with the tenth highest total DoD personnel. The state is also ranked ninth for the highest military retiree population with 56,969 retirees among the 417,515 military veterans. In addition, there are an estimated 752 defense contractors. One out of every 12 jobs in South Carolina is generated by the military community. In 2017, the average compensation for jobs supported by military in the state was \$54,701 per year compared to the state average of \$39,928 (SCMBTF, 2017). The total number of direct and indirect jobs supported by the military community in the state is 181,847 of which approximately 38 percent (68,529 jobs) are generated in the Charleston region.

The military community in the Charleston region, which includes JB CHS along with the U.S. Coast Guard, USACE, DoD contracting firms, military retirees and veterans, and portions of the South Carolina National Guard and U.S. Army Reserve, contains the largest military presence in the state with 13,810 service members, 71,011 veterans, 15,090 retirees, and 4,612 DoD civilians. JB CHS alone is associated with 50,303 direct, indirect, and induced jobs and \$3.6 billion in direct, indirect, and induced labor income throughout the state of which 47,344 jobs and \$3.4 billion in labor income are concentrated within the Charleston region (SCMBTF, 2017). Several major industries in terms of economic output that JB CHS supports throughout the state and the Charleston region include: computer related services; architectural, engineering, and related services; all other professional, scientific, and technical services; imputed rental activity for owner-occupied dwellings; and maintenance and repair construction (SCMBTF, 2017).

Economic Activity

Important economic activities in the region include the military presence and transportation (i.e., Port of Charleston and Charleston International Airport), as well as tourism. The military community is an important economic contributor to local and regional areas. The total economic impact of the military has been estimated at \$24.1 billion and 8.4 percent of the state's economy (SCMBTF, 2017). Nearly 45 percent (\$10.8 billion) of the total statewide economic impact is generated in the Charleston region (SCMBTF, 2017). The total statewide economic impact of JB CHS is estimated at \$10.8 billion and of which over 61 percent (\$6.6 billion) is concentrated in the Charleston region (SCMBTF, 2017).

The South Carolina Ports Authority (SCPA) and the Charleston International Airport Complex are important economic drivers for the area. The SCPA currently owns and operates the Port of Charleston and the Port of Georgetown, and an Inlands Port located in Greer. The SCPA is also undergoing

construction for an inland port in Dillon (SCMBTF, 2017). The impacts of the SCPA are estimated to contribute \$53 billion in annual economic activity, 187,600 jobs, \$10.2 billion in labor income, 10 percent of the total annual gross state product, and \$912 million in tax revenue (SCPA, 2019). The Port of Charleston is also an important military asset. A study conducted by the Center for Business Research estimated the annual economic impact of the Charleston International Airport to the tri-county Charleston region totaled over \$1.1 billion and supported 10,096 jobs and \$396 million in labor income (CBR, 2015). Tourism would not be affected by the Proposed Action and is not discussed further.

Tax Revenue

The estimated annual tax revenue generated by the military community throughout South Carolina was estimated at \$884.1 million (SCMBTF, 2017). Charleston County had the largest defense spending with \$1.6 billion in 2015. Among South Carolina counties with the highest defense spending, Berkeley County ranked third with \$700.3 million and Dorchester County ranked seventh with \$181.1 million (Office of Economic Adjustment, 2015). Seven percent of defense contracts was spent on construction (Office of Economic Adjustment, 2015).

3.11.3 Environmental Consequences

Analysis of impacts to socioeconomics is focused on the effects of the alternatives on employment, economic activity, and tax revenue.

3.11.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no change to the socioeconomics of the local area or region. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

3.11.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area for socioeconomic analyses for Alternative 1 is defined as the Charleston region, which includes Berkeley County, Charleston County, and Dorchester County in South Carolina. DoD spending from defense contracts with private companies for equipment, supplies, construction, and various services benefit the state and local communities.

During construction, there would be beneficial impacts to the local area from expenditures associated with the use of local labor and supplies. However, benefits would be minor and temporary, lasting only for the duration of the activity. Therefore, implementation of Alternative 1 would not result in significant impacts to the socioeconomics of the local area or region.

3.11.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for socioeconomic analyses for Alternative 2 is the same as described under Alternative 1. Potential impacts under Alternative 2 would be similar to those described under Alternative 1. Therefore, implementation of this action alternative would not result in significant impacts to the socioeconomics of the local area or region.

3.11.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for socioeconomic analyses for Alternative 3 is the same as described under Alternative 1. Potential impacts under this alternative would be similar to those described under Alternative 1. Potential impacts under Alternative 3 would be similar but potentially less than those

described under Alternative 1 since there would be less construction associated with the smaller clear zone in some areas. Construction under this alternative would provide temporary and minor beneficial socioeconomic impacts from the use of local labor and supplies. Therefore, implementation of this action alternative would not result in significant impacts to the socioeconomic of the local area or region.

3.11.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for socioeconomic analyses for Alternative 4 is the same as described under Alternative 1. Potential impacts under this alternative would be similar to those described under Alternative 1. Construction under this alternative would provide temporary and minor beneficial socioeconomic impacts from the use of local labor and supplies. Therefore, implementation of this action alternative would not result in significant impacts to the socioeconomic of the local area or region.

3.12 Environmental Justice and Protection of Children

3.12.1 Regulatory Setting

USEPA defines environmental justice as, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (USEPA, 2019b).

Consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the Navy’s policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to “make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” The term “children” refers to any person at age 17 or under (U.S. Air Force, 2014). U.S. Air Force guidance for implementation of EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, is contained in the publication entitled *Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*, dated November 2014 (U.S. Air Force, 2014). The EIAP acknowledges that while there are no standard procedures or regulatory requirements for including elderly populations in the impact analysis process, it is important to address potential issues that may adversely impact them. Elderly populations are defined as any person age 65 or over.

3.12.2 Affected Environment

Minority and Low Income Populations

Two census block groups within one census tract occur within the ROI. The Proposed Action would occur within Census Tract 207.24, Census Block Groups 1 and 2, Berkeley County, South Carolina (Figure 3-9).

Demographic and economic data for all census block groups that are adjacent to or wholly or partially within the study area were compared to similar countywide demographic and economic data to determine whether the Proposed Action could have disproportionately high and adverse effects on minority or low-income populations.

For purposes of this environmental justice analysis, a minority population is identified as an area where the minority population of the affected area exceeds 50 percent or where the minority population percentage of the affected area is “meaningfully greater” than the minority population percentage in the general population or other appropriate unit of geographic analysis. In this analysis, “meaningfully greater” is defined as anything greater than the area of comparison, namely, Berkeley County. The most recent data available for minority and low-income populations at the census block group level were available from the American Community Survey five-year estimates from 2013–2017. Low-income populations in the affected area are identified with the annual statistical poverty threshold from the U.S. Census Bureau.

As shown in Table 3-16 and Table 3-17, and based on the threshold levels described above, the Navy has determined that the ROI (Census Tract 207.24 and Census Block Groups 1 and 2 in Census Tract 207.24) is not equal to nor does it exceed the percent minority or the percent of low-income individuals than the area of comparison (Berkeley County).

Table 3-16 Minority Populations in Census Block Groups and Census Tracts Potentially Impacted by the Proposed Action

<i>Location</i>	<i>Census Tract</i>	<i>Census Block Group</i>	<i>Total Population</i>	<i>Number Minority</i>	<i>Percent Minority</i>
United States	-	-	321,004,407	123,726,618	38.54%
South Carolina	-	-	4,893,444	1,773,768	36.25%
Berkeley County	-	-	204,632	73,653	35.99%
Geographic ID					
450150207241	207.24	Block Group 1	2,142	701	32.73%
450150207242	207.24	Block Group 2	1,316	375	28.50%

Source: (USCB, 2017a) (USCB, 2017b)

Table 3-17 Low-Income Populations in Census Block Groups and Census Tracts Potentially Impacted by the Proposed Action

<i>Location</i>	<i>Census Tract</i>	<i>Census Block Group</i>	<i>Total Population for Whom Poverty is Calculated</i>	<i>Number Low-Income</i>	<i>Percent Low-Income</i>
United States	-	-	313,048,563	45,650,345	14.6%
South Carolina	-	-	4,751,345	790,657	16.6%
Berkeley County	-	-	200,835	25,648	12.8%
Geographic ID					
450150207241	207.24	Block Group 1	1,312	119	9.1%
450150207242	207.24	Block Group 2	0	0	0.00%

Sources: (USCB, 2017c) (USCB, 2017d) Note: Total population for whom poverty is calculated may differ than the total population as it excludes: residents of college dormitories, military housing, institutionalized group quarter populations and children under 15 who are, “not related to the reference person within the household by birth, marriage, or adoption (for example, foster children...” (USCB, 2017e)

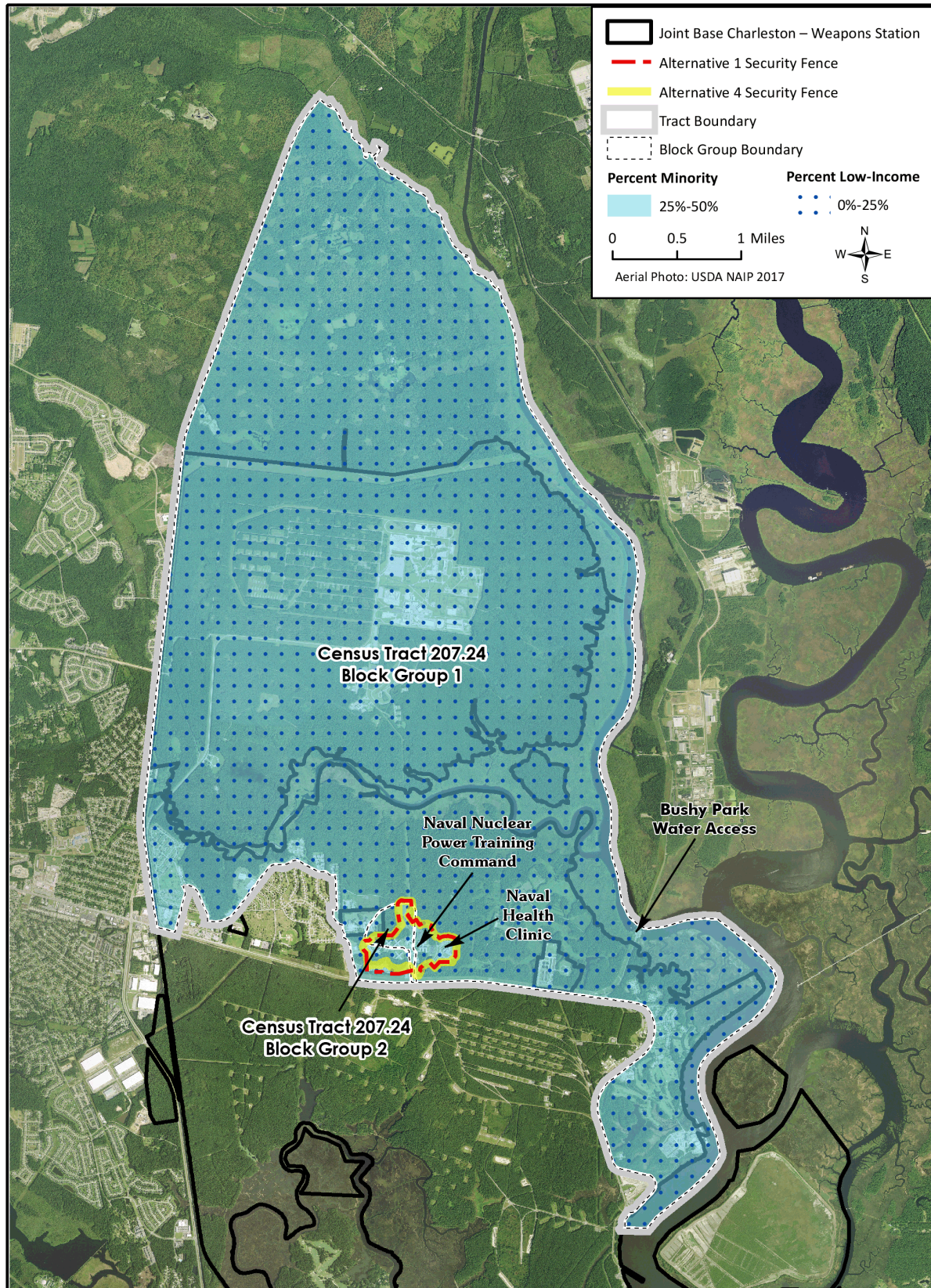


Figure 3-9 Minority and Low-Income Populations in Potentially Impacted Census Areas

Protection of Children from Environmental Health Risks and Safety Risks

To identify potential health and safety risks to children and elderly populations, the number of children and elderly in the affected environment were identified and then the potential impacts on the populations were analyzed. For this EA, the Proposed Action would occur entirely within the base boundaries; therefore, the affected environment is defined as Census Block Groups 1 and 2 within Census Tract 207.24, Berkeley County, South Carolina (Figure 3-10). The most recent data available for youth and elderly populations at the census block group level are available from the American Community Survey five-year estimates from 2013–2017. As shown in Table 3-18, Census Block Groups 1 and 2 within Census Tract 207.24 have a lower percent of the population identified as children and elderly compared to Berkeley County.

Table 3-18 Children and Elderly Populations in the Affected Environment

Location	Census Tract	Census Block Group	Total Population	Children		Elderly	
				Number	Percent	Number	Percent
United States	-	-	321,004,407	73,601,279	22.9	47,732,389	14.9
South Carolina	-	-	4,893,444	1,090,955	22.3	795,256	16.3
Berkeley County	-	-	204,632	49,664	24.3	25,975	12.7
Geographic ID							
450150207241	207.24	Block Group 1	2,142	345	16.1	32	1.5
450150207242	207.24	Block Group 2	1,316	0	0.0	0	0.0

Sources: (USCB, 2017f; USCB, 2017g)

As shown in Figure 3-10, there are two schools located on Census Tract 207.24. These schools include Marrington Elementary School and Marrington Middle School of the Arts. Both schools are part of the Berkeley County School District and also serve those students living in JB CHS-WS housing. There are no hospitals located within Census Tract 207.24; however, NHCC is located less than 0.25 mile from the nearest location of the fence and clear zone. There is one park, Bushy Park Water Access, located on Census Tract 207.24.

3.12.3 Environmental Consequences

This analysis focuses on the potential for a disproportionate and adverse exposure of specific off-base population groups to the projected adverse consequences discussed in the previous sections of this chapter.

3.12.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and there would be no changes that would affect minority or low-income communities. Therefore, no disproportionately high and adverse human health or environmental effects on any minority or low-income populations would occur with the implementation of the No Action Alternative. The No Action Alternative would maintain current conditions and would not pose environmental health and safety risks that would disproportionately affect children.

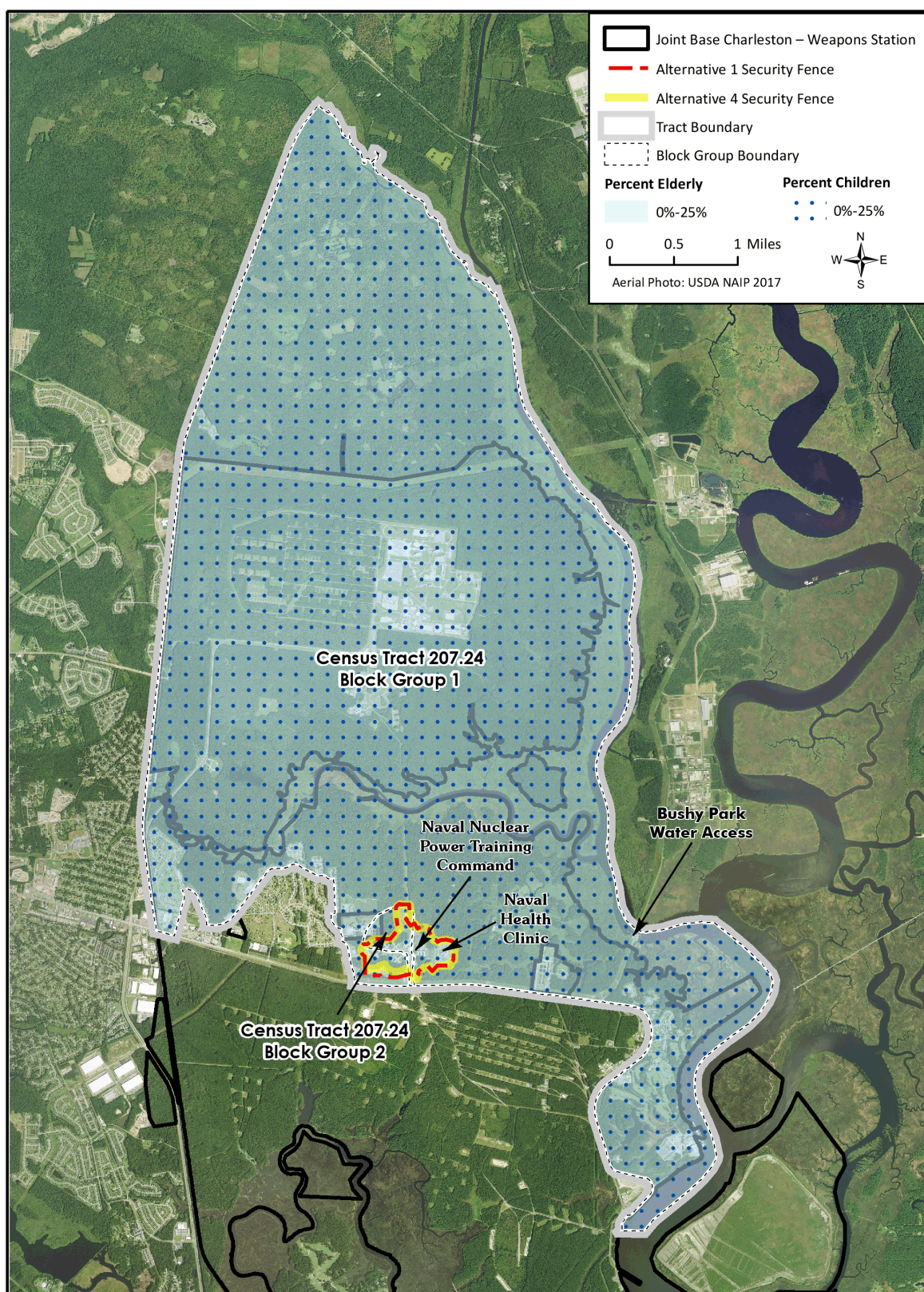


Figure 3-10 Children and Elderly Populations and Sensitive Receptors in the Affected Environment

3.12.3.2 Alternative 1: Install Perimeter Security Fence with Elevated Patrol Road and Culverts (Preferred Alternative)

The study area for Alternative 1 is defined as the census block groups and census tracts in which Alternative 1 would be located. There are two census block groups within one census tract within Berkeley County that are considered in this analysis and listed in Table 3-16 and Table 3-17.

As indicated in Table 3-16 and Table 3-17, the ROI does not equal or exceed the community of comparison and therefore disproportionate impacts to minority and low-income populations would not be anticipated. In addition, no significant negative environmental or human health impacts would be expected to occur as a result of construction or implementation of security improvements at the NNPTC and NHCC under this alternative. Some short-term impacts associated with construction including increased truck traffic, as well as noise, dust, and release of air emissions may occur; however, these impacts would be expected to be short term and minor and would not be significant. Fencing would occur on the base and there would be no significant impacts to land use or visual resources that would result in disproportionately high or adverse effects on environmental justice communities. In addition, Alternative 1 would not generate or disturb any known hazardous materials or wastes (Section 3.10, Hazardous Materials and Wastes). Therefore, under this alternative, there would be no disproportionately high and adverse human health or environmental effects on any minority or low-income populations.

Temporary impacts including increased traffic and construction noise could impact children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of construction occurs; however, the fence would improve security in the long term. Therefore, implementation of Alternative 1 would not pose environmental health and safety risks that would disproportionately affect children.

3.12.3.3 Alternative 2: Install Perimeter Security Fence with Low Water Crossings and No Culverts

The study area for Alternative 2 is the same as described for Alternative 1. Potential impacts under this alternative would be similar to Alternative 1 and therefore, no disproportionately high or adverse human health or environmental effects on any minority or low-income populations would be anticipated. Temporary impacts including increased traffic and construction noise could affect children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of construction occurs; however, the fence would improve security in the long term. Therefore, implementation of Alternative 2 would not pose environmental health and safety risks that would disproportionately affect children.

3.12.3.4 Alternative 3: Install Perimeter Security Fence without a Continuous Patrol Road

The study area for Alternative 3 is the same as described for Alternative 1. Potential impacts under this alternative would be similar to Alternative 1 and therefore, no disproportionately high or adverse human health or environmental effects on any minority or low-income populations would be anticipated. Temporary impacts including increased traffic and construction noise could affect children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of construction occurs; however, the fence would improve security in the long term. Therefore, implementation of Alternative 3 would not pose environmental health and safety risks that would disproportionately affect children.

3.12.3.5 Alternative 4: Install Perimeter Security Fence without Enclosing the Student Parking

The study area for Alternative 4 is the same as described for Alternative 1. Potential impacts under this alternative would be similar to Alternative 1 and therefore, no disproportionately high or adverse human health or environmental effects on any minority or low-income populations would be anticipated. Temporary impacts including increased traffic and construction noise could affect children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of construction occurs; however, the fence would improve security in the long term. Therefore, implementation of Alternative 4 would not pose environmental health and safety risks that would disproportionately affect children.

3.13 Summary of Potential Impacts to Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative is presented in Table ES-1. Impact avoidance and minimization measures are presented in Table 3-19.

Table 3-19 Impact Avoidance and Minimization Measures

<i>Measure</i>	<i>Anticipated Benefit / Evaluating Effectiveness</i>	<i>Implementing and Monitoring</i>	<i>Responsibility</i>	<i>Estimated Completion Date</i>
<i>Water Resources</i>				
Wetland and stream mitigation consisting of payment into wetland and stream mitigation banks for the amount of acres lost at a ratio to be determined by the USACE	Compensate for impacts associated with the discharge of dredge or fill into wetlands and other Waters of the United States		U.S Navy/Contractor	End of Construction 2020 and implementation of mitigation measures

4 Cumulative Impacts

This section (1) defines cumulative impacts, (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, (3) analyzes the incremental interaction the Proposed Action may have with other actions, and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations section 1508.7 as “the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

To determine the scope of environmental impact analyses, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact analysis document.

In addition, CEQ and the U.S. Environmental Protection Agency have published guidance addressing implementation of cumulative impact analyses—Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA, 1999). CEQ guidance entitled *Considering Cumulative Impacts Under NEPA* (CEQ, 1997) states that cumulative impact analyses should:

“...determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts...[and]...focus on truly meaningful impacts.”

Cumulative impacts are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

4.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this Environmental Assessment (EA), the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in Chapter 3 for the respective resource areas. The time frame for cumulative impacts centers on the duration of construction and ongoing maintenance of the Proposed Action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of “reasonably foreseeable” to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for Environmental Impact Statements and EAs, management plans, land use plans, and other planning related studies.

4.3 Past, Present, and Reasonably Foreseeable Actions

This section will focus on past, present, and reasonably foreseeable future projects and similar continuing operations at and near the Proposed Action locale. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 4.1 (Definition of Cumulative Impacts), it was determined if a relationship exists such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ, 2005), these actions considered but excluded from further cumulative impacts analysis are not catalogued here as the intent is to focus the analysis on the meaningful actions relevant to informed decision-making. Projects included in this cumulative impacts analysis are listed in Table 4-1 and briefly described in the following subsections.

Table 4-1 Cumulative Action Evaluation

Action	Level of NEPA Analysis Completed
Past Actions	
Public Private Venture for Family Housing	EA/FONSI 2007
Facilities Expansion at NPTU Charleston	EA/FONSI 2012
Aerial Application of Herbicides	EA/FONSI 2013
Present and Reasonably Foreseeable Future Actions	
Construct Entry Control Point/Perimeter Security/Commercial Vehicle Inspection	Planning stages
Berkeley County Water and Sanitation District, Construct Force Mains on Red Bank Rd.	Under design
South Carolina Department of Transportation, S-29 Red Bank Road Safety	Construction 2020

Key: EA = Environmental Assessment; FONSI = Finding of No Significant Impact; NEPA = National Environmental Policy Act;
NPTU = Naval Nuclear Power Training Unit

Past Actions

Public Private Venture for Family Housing. An EA was prepared and the Finding of No Significant Impact signed in 2007 to transfer management of the existing housing inventory of Navy owned-and-occupied family housing, including related improvements, to a private partner, towards an end-state inventory of 648 family housing units on-base. The Proposed Action included divestiture and demolition of 368 existing housing units and land comprising the Men Riv A development.

Facilities Expansion at Naval Nuclear Power Training Unit Charleston. An EA was prepared and the Finding of No Significant Impact and Finding of No Practicable Alternative was signed in 2012 to provide infrastructure improvements needed to accommodate current and future increases in student numbers at the Nuclear Power Training Unit (NPTU)-Charleston, South Carolina. The Proposed Action included demolishing, renovating, and upgrading existing facilities; constructing new academic and training facilities; relocating Moored Training Ship (MTS) support systems; increasing the number of parking spaces; expanding pier facilities to support uninterrupted MTS operation and training during the transition to the newer MTSS; and implementing improved security and access measures.

Aerial Application of Herbicides. An EA was prepared and the Finding of No Significant Impact signed in 2013 to control nonnative invasive plants in wetlands and spoil areas and vegetation competing with longleaf pine seedlings on JB CHS-WS through annual aerial herbicide applications. Invasive vegetation was expected to overtake wetland areas, reduce drainage, and could hinder installation security. Vegetation competing with native pine stands also needed to be suppressed with herbicide application to prevent the mortality of pine seedlings. Areas for spraying in 2013 were outside the proposed fence/clear zone project area. The closest areas identified for herbicide application were the wetland area located to the east, near Little David's and Big David's Pond, and a long-leaf restoration area located north of Foster Creek.

Present and Reasonably Foreseeable Actions

Construct Entry Control Facility/Perimeter Security/Commercial Vehicle Inspection. The U.S. Air Force proposes to construct a new Entry Control Facility (ECF) with a new guard house and guard booths for the privately owned vehicle (POV) lanes, and a new Commercial Vehicle Inspection (CVI) area with a search office and truck X-ray. The ECF will also have an active vehicle barrier and an overwatch building. A Visitor Center was built in 2013 off Red Bank Road. The Visitor Center can be converted to accommodate the new ECF. There will be two canopies for the ECF: one for the POV lanes and one for the CVI area. The ECF will have two inbound lanes and two outbound lanes off Red Bank Road with a raised median between the lanes. The two inbound lanes will split into four inbound lanes with two for POVs and two for commercial vehicles. Security fencing will be provided as part of the Proposed Action along the perimeter of the base next to Red Bank Road and will tie into the new ECF to create a secure perimeter around the base. Currently there are nine entrances onto the base off Red Bank Road. The goal of the ECF is to eliminate all but one entrance and make a main access point for the base. The north side of Red Bank Road is preferred for the new ECF. The new ECF project will require the widening of Red Bank Road.

Berkeley County Water and Sanitation District, Construct Force Mains on Red Bank Road. Currently there is a 150-foot South Carolina Electric and Gas right-of-way along the north side of Red Bank Road at the Webster intersection. There are also two force mains on either side of Red Bank Road for Berkeley County Water and Sanitation (BCWS). A 36-inch force main is located on the south side of Red Bank and

a 30-inch force main is located on the north side of Red Bank. BCWS is currently in the process of redesigning and rerouting the 30-inch force main to a 42-inch force main.

South Carolina Department of Transportation (SCDOT), S-29 Red Bank Road Safety Improvements.

SCDOT is conducting operational and safety analysis and engineering design for a 1.3-mile section of Red Bank Road (S-29) between Eagle Road (S-251) and Garwood Road (S-585). This project will evaluate traffic safety improvements, including raised medians, sidewalks, and street lights. A public meeting was held on March 14, 2019. The proposed project schedule has preliminary design in the summer of 2019, right-of-way acquisition, as needed, in the winter of 2019, final design in the spring of 2020, and construction in the summer of 2020.

4.4 Cumulative Impact Analysis

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data are not available and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in Chapter 3, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts.

The resource areas evaluated for cumulative impacts include water, biological resources, land use, geological resources (soils), infrastructure, air quality, noise, public health and safety, hazardous materials and wastes, socioeconomics, and environmental justice. The Proposed Action would have no effect on cultural resources; therefore, cumulative impacts were not analyzed.

4.4.1 Water Resources

Description of Geographic Study Area

The region of influence (ROI) for cumulative impacts to water resources includes the watershed and surrounding areas.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions include land or wetland disturbing actions that are located in the same watershed as the Proposed Action. These projects include the Public/Private Venture (PPV) housing, ECF/CVI, NPTU expansion, herbicide application, BCWS, SCDOT S-29 Red Bank Road improvements, and Red Bank Road widening.

Cumulative Impact Analysis

Cumulative water resources impacts that would occur with implementation of the Proposed Action and the other projects would include increased sedimentation from ground disturbance, increased stormwater runoff from new impervious surfaces, and changes to wetland values and functions from conversion and fill. Cumulative impacts to water resources from past, present, and future actions within the ROI would be less than significant because best management practices (BMPs) to control stormwater runoff, erosion, and sedimentation would be used throughout all phases of construction for each project. The PPV conversion and NPTU expansion are already complete so would not pose cumulative construction impacts on water resources. The ECF/CVI would pose cumulative impacts to water resources; however, construction would occur after the fence and patrol road.

Wetland impacts associated with the fence and clear zone include conversion wetland filling (2.97 acres) and could pose cumulative wetland impacts. All wetland modifications and fill would be coordinated and permitted through the U.S. Army Corps of Engineers and the South Carolina Department of Health and Environmental Control. There will be permit conditions to reduce impacts and mitigation required to compensate for wetland losses. The ECF/CVI may impact wetlands but it is early in the planning process and the acreage of wetland impact is not known. The PPV project did not impact wetland areas; however, the NPTU expansion impacted 7 acres of wetland areas. The roadway improvement projects and the water main relocation are all linear and would likely impact disturbed habitat located adjacent to the road. However, some wetland areas may be impacted and could pose cumulative impacts to water resources. The herbicide application project along with annual herbicide and spot treatments associated with the Proposed Action could pose cumulative impacts to wetlands and water quality. The purpose of the herbicide application project was to prevent wetland areas from being overtaken by invasive species. While water quality impacts may occur, the application would be beneficial for preserving wetland areas. JB CHS-WS has 1,664 acres of freshwater wetlands and 1,356 acres of tidal wetlands. Although the loss of wetland habitat associated with past, present, and reasonably foreseeable projects would be cumulative, with BMPs and mitigation, and the remaining wetlands on the base, the Proposed Action would not result in significant cumulative impacts to water resources within the ROI.

4.4.2 Biological Resources

Description of Geographic Study Area

The ROI for cumulative impacts to biological resources includes Joint Base Charleston – Weapons Station (JB CHS-WS) and adjacent natural communities.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions include habitat disturbing actions that are located at JB CHS-WS and adjacent natural communities. These include PPV housing, NPTU expansion, ECF/CVI, BCWS, and SCDOT S-29 Red Bank Road improvements.

Cumulative Impact Analysis

Cumulative biological resources impacts that would occur with implementation of the Proposed Action when combined with other projects would include permanent loss of vegetation and wildlife habitat from land clearing, permanent and temporary impacts to wildlife species (including migratory birds), and loss of potential habitats for threatened and endangered species (red-cockaded woodpecker and wood stork).

Cumulative biological resource impacts from past, present, and future actions within the ROI would be less than significant because construction would occur at different times. For example, the PPV housing demolition is complete so the project would not present cumulative construction impacts with the Proposed Action. The ECF/CVI would result in vegetation clearing. When combined with clearing associated with the Proposed Action fence and patrol road, there could be cumulative impacts to vegetation and wildlife habitat. The Proposed Action would disturb forest and wetland areas. However, direct adverse impacts to wildlife (including migratory birds) would be minimized and avoided by implementing BMPs, including time-of-year restrictions (to the maximum extent practicable), and conservation measures such as pre-construction surveys, identifying impact-minimizing access routes, and implementing soil stabilization and restoration techniques.

The Proposed Action may affect, but is not likely to adversely affect one federally threatened species and one federally endangered species due to the loss of potential suitable habitats, including 0.6 acre of red-cockaded woodpecker management area and 2.97 acres of wetland habitat for the wood stork (e.g., under Alternative 1). This, combined with any forested or wetland acreage proposed for clearing under the ECF/CVI project, would pose cumulative impacts. The fence and clear zone would be cleared prior to the ECF/CVI project; therefore, the construction projects would not be occurring simultaneously, and all projects would require implementation of BMPs. This would allow species to relocate to similar habitats nearby. There are an estimated 8,915 acres of forested area, 1,664 acres of freshwater wetlands, and 1,356 acres of tidal wetlands at JB CHS-WS. The ECF/CVI may impact wetlands, but it is early in the planning process and the acreage of wetland impact is not known. The PPV project did not impact wetland areas; however, the NPTU expansion impacted 7 acres of wetland areas. The roadway improvement projects and the water main relocation are all linear and would likely impact disturbed habitat located adjacent to the road. As a result, the Proposed Action combined with the past, present, and reasonably foreseeable future projects, could pose cumulative impacts but would not result in significant cumulative impacts to threatened and endangered species within the ROI.

4.4.3 Land Use

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on land use is the project site and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions with potential cumulative impacts when considered with the Proposed Action include the Naval NPTU expansion, ECF/CVI, BCWS, and SCDOT S-29 Red Bank Road improvements.

Cumulative Impact Analysis

Cumulative land use impacts are those impacts that would occur with implementation of the Proposed Action when combined with other projects that would include land use changes due to new construction. The proposed fence and clear zone would impact the amount of open space; however, the future land use plan re-designated the land use from Open Space to Administrative and Medical/Dental land uses. The ECF/CVI and NPTU projects would result in new construction and when combined with the proposed fence and patrol road, could pose cumulative impacts to land use. The ECF/CVI project is in the early planning stages; therefore, the final preferred location and land use impact are unknown. The NPTU project had minor impacts to land use classification. The new facilities were constructed within areas classified as training except for the 8-acre parking areas, which were classified as undeveloped. The land use was considered consistent with existing land use conditions. The roadway improvement projects and the water main relocation are all linear and would likely impact lands adjacent to the road, which would be consistent with current land use and not pose cumulative land use impacts. As a result, the Proposed Action, when combined with the past, present, and reasonably foreseeable future projects, could pose cumulative impacts to open space assuming that the ECF/CVI project location would impact open space but would not result in significant impacts within the ROI because the number of gates and access points would be reduced and may convert back to open space.

4.4.4 Soils

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on soils is the project site and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions with potential cumulative impacts when considered with the Proposed Action include the PPV, Naval NPTU expansion, ECF/CVI, BCWS, and SCDOT S-29 Red Bank Road improvements.

Cumulative Impact Analysis

The Proposed Action would have temporary impacts to soils due to disturbance from construction. However, with the use of standard BMPs for prevention of erosion and sedimentation, impacts to soils would be negligible and short term. Relevant past, present, and future actions that include construction of new facilities at the same time as the Proposed Action may cumulatively affect soils at JB CHS-WS. The PPV and NPTU projects are complete. The proposed fence/clear zone would be expected to be complete before the ECP/CVI project. The herbicide application project does not involve construction.

Other actions in the ROI (Berkeley County project and SCDOT project) could occur at the same time and location along Red Bank Road and contribute cumulatively to impacts to soils. These projects would be temporary in duration and all would implement BMPs to reduce erosion and sedimentation; therefore, cumulative impacts to soils would not be significant.

4.4.5 Infrastructure

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on infrastructure is the project site and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions that include construction of new facilities and/or the relocation or construction of new utilities may cumulatively affect infrastructure at JB CHS-WS.

Cumulative Impact Analysis

The PPV and NPTU projects are complete. The proposed fence/clear zone would be expected to be complete before the ECP/CVI project. The herbicide application project does not involve construction. Impacts during construction would include an increase in the number of workers at the base using water, electric, and gas and generating wastewater and solid waste. Only the fence/clear zone, Berkeley County project, and SCDOT project could occur at the same time. Therefore, these projects when combined with the Proposed Action could have cumulative impacts on infrastructure use.

The Proposed Action would not permanently increase, decrease, or otherwise change demand for utilities as no additional personnel would be assigned to the base for the fence and clear zone project. After construction, there would be a slight increase in the need for electricity for lighting. However, light-emitting diode lights would be used to assist with lowering energy use. Other projects requiring energy use during operations include the ECP/CVI and could pose cumulative impacts on energy use.

These projects would use the latest in energy efficient lighting; therefore, significant impacts on energy use would not occur.

Other actions in the ROI (Berkeley County project and SCDOT project) could occur at the same time and location (i.e., along Red Bank Road); therefore, those actions could contribute cumulatively to impacts to infrastructure. The Berkeley County project is relocating force mains to accommodate Red Bank Road widening. Additional electric lines may be needed for the ECP/CVI and the Proposed Action; therefore, there could be cumulative impacts on infrastructure. These impacts would not be considered significant since BMPs would be used during construction and lighting would be new and energy efficient.

The Proposed Action and the ECP/CVI would have a cumulative beneficial impact on infrastructure and utilities because both would lessen antiterrorism vulnerabilities and terrorist threats to base infrastructure. Although the projects, when combined with the Proposed Action, could have cumulative impacts on infrastructure use, impacts would not be expected to be significant due to use of energy efficient equipment and partially offset by the beneficial impacts of improved security.

4.4.6 Air Quality

Description of Geographic Study Area

For cumulative impacts, the ROI is defined as Berkeley and Charleston Counties and the surrounding areas within the Charleston Interstate Air Quality Control Region (AQCR).

Relevant Past, Present, and Future Actions

Relevant activities include all military, civil, and commercial projects in the area that utilize gasoline or diesel-powered fossil fuel combustion engines. All of these activities contribute to the overall regional air quality.

Cumulative Impact Analysis

Air quality impacts and emissions associated with the Proposed Action construction would be minor. Depending on the timing of other infrastructure improvement and construction projects occurring in Berkeley and Charleston Counties and in the surrounding areas within the Charleston Interstate AQCR (which is the ROI for cumulative impacts), incremental increases in air emissions would result from construction. However, emissions from several, simultaneous projects would not be likely to result in temporary or long-term combined emissions that would exceed county significance criteria or negatively affect attainment status.

Cumulative air quality impacts from past, present, and future actions within the ROI would be less than significant because although additional construction would occur in the foreseeable future and would result in temporary increases in air pollutant emissions, impacts would be primarily short-term and localized. The primary pollutant from construction would be particulate matter in the form of fugitive dust. This source of emissions is by nature short-term and the impacts would be localized to the immediate area. To minimize these emissions, application of wetting agents during dry periods may be used to reduce emissions. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in significant impacts within the ROI.

4.4.7 Noise

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on noise is the fence and clear zone project area and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant projects include military, civil, and commercial construction and maintenance projects in the immediate project area that use noise-generating equipment. All of these activities would contribute to the localized noise environment.

Cumulative Impact Analysis

The Proposed Action would have temporary impacts on noise levels due to the use of heavy equipment during construction. However, with the use of standard BMPs, impacts to noise would be negligible and short term. Relevant past, present, and future actions that include construction of new facilities at the same time as the Proposed Action may cumulatively affect noise at JB CHS-WS. The PPV and NPTU projects are complete. The proposed fence/clear zone would be expected to be complete before the ECP/CVI project. The herbicide application project does not involve construction. Other actions in the ROI (Berkeley County project and SCDOT project) could occur at the same time and location (i.e., along Red Bank Road); therefore, those actions could contribute cumulatively to impacts to noise levels. These projects would be temporary and all would implement BMPs to reduce noise during nighttime; therefore, cumulative impacts to noise levels would not be significant.

4.4.8 Public Health and Safety

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on public health and safety is the project site and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions that include construction of new facilities and security improvement projects may cumulatively affect public health and safety in the local community.

Cumulative Impact Analysis

The Proposed Action, the ECP/CVI, and the SCDOT project would pose a cumulative beneficial impact on public health and safety because all would improve safety. The Proposed Action and the ECP/CVI would lessen antiterrorism vulnerabilities and terrorist threats to base infrastructure. The projects, when combined with the Proposed Action, could have beneficial cumulative impacts on health and safety due to improved road safety and base security. During construction of these projects, if they occur at the same time, there would be a short-term increase in the number of workers, traffic, and noise in the construction zone. These temporary impacts would not result in a significant impact to public health and safety considering the beneficial impacts of improved security.

4.4.9 Hazardous Materials and Wastes

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on hazardous materials and wastes is the fence and clear zone project area and the immediate surrounding area.

Relevant Past, Present, and Future Actions

Relevant projects include military, civil, and commercial construction and operation and maintenance projects in the immediate project area that could use hazardous materials and generate hazardous wastes requiring treatment and/or disposal.

Cumulative Impact Analysis

The Proposed Action would use minor amounts of hazardous materials during the construction, including fuels, paints, sealants, adhesives, etc. During fence and clear zone maintenance, herbicides could be used on an annual basis and spot treatments, as needed. All hazardous wastes would be managed in cooperation with the 628 CES and in accordance with all federal, state, and local regulations. Relevant past, present, and future actions that include construction of new facilities may cumulatively affect hazardous materials and wastes at JB CHS-WS. The PPV and NPTU projects are complete and any hazardous materials used and hazardous wastes generated would have been appropriately managed. The ECP/CVI, herbicide application, Berkeley County, and SCDOT projects would use limited hazardous materials and generate small quantities of hazardous waste. Therefore, those actions could contribute cumulatively to impacts to hazardous materials and wastes. These projects would be temporary and all will be managed in accordance with all federal, state, and local regulations; therefore, cumulative impacts to hazardous materials and wastes would not be significant.

4.4.10 Socioeconomics

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on socioeconomics is the project site and the local community.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions that include construction of new facilities may cumulatively affect socioeconomics in the local community.

Cumulative Impact Analysis

The PPV and NPTU projects are complete; therefore, the economic benefits have already been realized. The proposed fence/clear zone, ECP/CVI project, Berkeley County project, and SCDOT project could occur at the same time and contribute cumulatively to socioeconomic benefits. Although, construction would only represent a one-time injection of funds, all the projects together would represent a benefit to the local economy. Therefore, there would be no significant cumulative impacts on the economy.

4.4.11 Environmental Justice and Protection of Children

Description of Geographic Study Area

The geographic study area for analyzing cumulative impacts on environmental justice and children is the project site and the local community.

Relevant Past, Present, and Future Actions

Relevant past, present, and future actions that include construction of new facilities in the area may cumulatively affect environmental justice communities and children.

Cumulative Impact Analysis

The ROI for environmental justice communities does not equal or exceed the community of comparison; therefore, disproportionate impacts to minority and low-income populations would not be anticipated. In addition, no significant negative environmental or human health impacts would be expected to occur as a result of the Proposed Action. Some short-term impacts associated with construction including increased truck traffic, as well as noise, dust, and release of air emissions may occur; however, these impacts would be expected to be short term and minor and would not be significant. These temporary impacts could affect children attending the two nearby schools for the short time construction would be in the area, depending on the time of year of construction occurs; however, the fence would improve security in the long term. The ECP/CVI, Berkeley County, and SCDOT projects could occur at the same time and contribute cumulatively to construction impacts to children attending the two school. However, these projects would improve safety in the long term; therefore, would offset the temporary construction impacts. Therefore, there would be no significant cumulative impacts that would result in disproportionately high and adverse human health or environmental effects on minority or low-income populations. There would also be no significant cumulative impacts on environmental health risks and safety that would disproportionately affect children.

This page intentionally left blank.

5 Other Considerations Required by NEPA

5.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 Code of Federal Regulations section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 5-1 identifies the principal federal and state laws and regulations that are applicable to the Proposed Action, and describes briefly how compliance with these laws and regulations would be accomplished.

Table 5-1 Principal Federal and State Laws Applicable to the Proposed Action

<i>Federal, State, Local, and Regional Land Use Plans, Policies, and Controls</i>	<i>Status of Compliance</i>
National Environmental Policy Act (NEPA); CEQ NEPA implementing regulations; Navy procedures for implementing NEPA	Compliant. This document provides compliance with NEPA.
Clean Air Act	Compliant. Air pollutant emissions would be generated from vehicles and equipment used during construction and operation and maintenance. However, these emissions would be temporary and would not affect the attainment status of the region or result in more than de minimis levels of emissions.
Clean Water Act	Compliant. The Proposed Action would adhere to all applicable Clean Water Act requirements including obtaining NPDES and Section 401/404 permits. The Navy or contractor would be responsible for complying with all permit conditions.
Rivers and Harbors Act	Compliant. The Proposed Action would adhere to all applicable Section 10 Rivers and Harbors Act and Clean Water Act requirements including obtaining a permit from USACE and implementation of permit conditions.
Coastal Zone Management Act	Coastal Consistency Determination (CCD) was prepared and submitted to the SCDHEC (Appendix F). The Navy determined that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the South Carolina Coastal Zone Management Program.
National Historic Preservation Act	Compliant. No effect on historic properties. On November 14, 2018, the State Historic Preservation Officer concurred with the Navy's assessment that no properties listed in or eligible for listing in the National Register of Historic Places will be affected by this project.
Endangered Species Act	Compliant. The Navy determined that the Proposed Action may affect but is not likely to adversely affect the RCW and wood stork. No effect on the northern long-eared bat, manatee, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry, as they are not known to occur or do not have potential to occur within the project area and/or would not be affected by the Proposed Action. USFWS concurred with the Navy's effect determinations on June 12, 2019. (Appendix C, Endangered Species Act Documentation, contains a full discussion of effects determinations, analyses for all species, and the USFWS concurrence letter dated June 12, 2019)

Table 5-1 Principal Federal and State Laws Applicable to the Proposed Action

<i>Federal, State, Local, and Regional Land Use Plans, Policies, and Controls</i>	<i>Status of Compliance</i>
Magnuson-Stevens Fishery Conservation and Management Reauthorization Act	Compliant. There is no EFH located within the project area; there are no impacts to EFH; therefore, the Proposed Action would not adversely affect EFH.
Migratory Bird Treaty Act	Compliant. The Proposed Action would not result in a significant adverse effect on a population of migratory birds. In accordance with the INRMP, the installation Natural Resources manager will be informed before any action is taken that may affect any migratory bird species.
Bald and Golden Eagle Protection Act	Not applicable. The Proposed Action would not result in the take of bald or golden eagles.
Comprehensive Environmental Response and Liability Act	Compliant. The Proposed Action would not affect contaminated sites or their cleanup.
Emergency Planning and Community Right-to-Know Act	Compliant. The Proposed Action would not affect the amount of hazardous chemicals present at the facility or the amount of hazardous materials that are manufactured, processed, or otherwise used.
Federal Insecticide, Fungicide, and Rodenticide Act	Compliant. The Proposed Action would be in accordance with the provisions in the base's <i>Integrated Pest Management Plan</i> . The JB CHS Integrated Pest Management Plan would need to be updated to address the Proposed Action.
Resource Conservation and Recovery Act	Compliant. The Proposed Action would result in the generation of solid and hazardous wastes resulting from construction. These wastes would be managed in full compliance with this act.
Toxic Substances Control Act	Compliant. The Proposed Action would not result in the disposal of Toxic Substances Control Act substances.
Farmland Protection Policy Act	Compliant. The Farmland Protection Policy Act does not apply as this action is being proposed for a national defense purpose during a time of national emergency.
Executive Order 11988, <i>Floodplain Management</i>	Compliant. No development in the 100- or 500-year floodplain.
Executive Order 11990, <i>Protection of Wetlands</i>	Compliant. The Executive Order requires federal agencies, in planning their actions, to consider alternatives to wetland areas and limit potential damage if an activity affecting a wetland cannot be avoided. Compensatory mitigation will be required for wetland impacts since there is no practicable alternative. To offset wetland impacts, the Navy will purchase the appropriate wetland credits from existing, local banks and prepare a Mitigation Plan detailing components, execution strategy, organizational responsibilities, and schedule as part of the permitting process.
Executive Order 12088, <i>Federal Compliance with Pollution Control Standards</i>	Compliant. The Proposed Action would comply with all applicable pollution control standards.

Table 5-1 Principal Federal and State Laws Applicable to the Proposed Action

<i>Federal, State, Local, and Regional Land Use Plans, Policies, and Controls</i>	<i>Status of Compliance</i>
<i>Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations</i>	Compliant. The Proposed Action would not cause disproportionately high and adverse human health or environmental effects on any minority or low-income populations.
<i>Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks</i>	Compliant. The Proposed Action would not pose environmental health and safety risks that would disproportionately affect children. The fence would protect the general public, as well as children.

Key: CCD = Coastal Consistency Determination CEQ = Council on Environmental Quality; NEPA = National Environmental Policy Act; NPDES = National Pollutant Discharge Elimination System; SCDHEC = South Carolina Department of Health and Environmental Control; USACE = U.S. Army Corps of Engineers

5.2 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Implementation of the Proposed Action would involve the consumption of fuel, oil, and lubricants for construction vehicles; and loss of natural resources (wetland areas and forested vegetation). However, wetland mitigation, sale of timber, and the physical security improvements would partially offset the losses. Implementing the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

5.3 Unavoidable Adverse Impacts

This Environmental Assessment (EA) has determined that the alternatives considered would not result in any significant impacts. Implementing the alternatives would result in the following unavoidable environmental impacts:

- filling of wetlands
- impacting streams
- reduction of forested areas
- loss of wildlife habitat

5.4 Relationship between Short-Term Use of the Environment and Long-Term Productivity

The National Environmental Policy Act (NEPA) requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Air quality and noise would be impacted in the short term. In the long term, construction and operation would impact wetland areas and forest vegetation but not significantly impact the long-term natural resource productivity of the area. The Proposed Action would result in beneficial impacts of increased safety from unauthorized access.

6 References

- Advisory Council on Historic Preservation. (2004). *Program Comment for Wherry and Capehart Era Family Housing at Air Force and Navy Bases*.
- Advisory Council on Historic Preservation. (2006a). *World War II and Cold War Era Ammunition Storage Facilities*.
- Advisory Council on Historic Preservation. (2006b). *Cold War Era Unaccompanied Personnel Housing*.
- AECOM. (2018). *Installation Development Plan Joint Base Charleston*. Charleston.
- Audubon. (2017). *Atlantic Flyway*. Retrieved March 27, 2019, from <http://www.audubon.org/atlantic-flyway>
- BEA. (2018). *Bureau of Economic Analysis*. Retrieved from CAEMP25N Total Full-Time and Part-Time Employment: <https://apps.bea.gov/itable/itable.cfm?ReqID=70&step=1>. November 15.
- Berkeley County. (2010). *Comprehensive Plan*. Charleston.
- Brockington and Associates, Inc. (2002). *Intensive Archaeological Survey of Selected Portions of the Charleston Naval Weapons Station, Berkeley County, South Carolina*.
- CBR. (2015). *Economic Impact of the Charleston International Airport Complex*. Retrieved from Charleston Metro Chamber of Commerce: www.charlestonchamber.org. January.
- CEQ. (1997). *Considering Cumulative Effects Under the National Environmental Policy Act*. Washington, DC.
- CEQ. (2005). *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*. Washington: EPA.
- Charleston County. (2019). *Landfill and Garbage Information Bees Ferry Landfill*. Charleston: Charleston County. Retrieved March 29, 2019, from <https://www.charlestoncounty.org/departments/environmental-management/landfill-garbage.php>
- Charleston Metro Chamber of Commerce. (2019). *Charleston Chamber*. Retrieved from Economic Outlook Forecast 2019-2020: <https://www.charlestonchamber.org/economic-outlook-forecast/>
- City of Goose Creek. (2015). *Comprehensive Plan*. Goose Creek: Vol 1 .
- Covington. (2019). Jacksonville: Email from Donna Covington, NAVFAC SE Architectural Historian to Peggy Farrell, Leidos.
- Cowan, J. P. (1994). *Handbook of Environmental Acoustics*. New York: John Wiley & Sons.
- Cowardin et al. (1979). *Classification of Wetlands and Deepwater Habitats of the United States*. Washington: U.S. Fish and Wildlife Service.
- DoD. (2004). *UFC 3-250-09FA Aggregate Surfaced Roads and Airfield Areas*. Department of the Army.
- DoD. (2009). *Physical Security Program*. Washington, D.C.: Department of Defense, Under Secretary of Defense for Intelligence.

- DoD. (2013). *Unified Facilities Criteria (UFC) 4-022-03, Security Fences and Gates*. Department of Defense.
- DoD. (2018). *UFC 4-010-01 DoD Minimum Standards for Buildings*. Washington.
- Evans. (2019). *Personal communication via email*.
- Federal Interagency Committee on Noise. (1992). *Federal Review of Selected Airport Noise Analysis Issues*.
- Federal Interagency Committee on Urban Noise. (1980). *Guidelines for Considering Noise in Land Use Planning and Control*. Washington, DC.
- Federal Register. (2018). *Continuation of the National Emergency With Respect to Certain Terrorist Attacks*. Executive Office of the President. Washington: Federal Register. Retrieved April 26, 2019, from <https://www.federalregister.gov/documents/2018/09/12/2018-19945/continuation-of-the-national-emergency-with-respect-to-certain-terrorist-attacks>
- FHWA. (2006). *Roadway Construction Noise Model*. Washington D.C.: Federal Highway Administration.
- Larimer. (2019). *Personal Communication*. Sarah Rauch, Leidos and Terrence Larimer, USAF 628th CES/CEIE. Retrieved April 16, 2019
- National Institute for Occupational Health and Safety. (1998). *Criteria for a Recommended Standard Occupational Noise Exposure, Revised Criteria*. Cincinnati: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- Navy. (1996). *Department of the Navy, Naval Weapons Station Charleston. USACE Charleston District Office. 404 Permit Application*. U.S. Army Corps of Engineers.
- Navy. (2007). *Public Private Venture for Family Housing Charleston Naval Weapons Station*. Charleston: U.S. Navy.
- Navy. (2011). *NTTP 3-07.2.3 Law Enforcement and Physical Security*. Norfolk: U.S. Navy.
- Navy. (2012). *Integrated Cultural Resources Management Plan for Joint Base Charleston (Weapons)*. Naval Facilities Engineering Command Southeast.
- Navy. (2013). *Joint Base Charleston Red-cockaded Woodpecker Management Plan*. Charleston: U.S. Navy.
- Navy. (2015). *Environmental Assessment for the NOLF Imperial Beach Perimeter Fence NB Coronado*. San Diego: Naval Facilities Engineering Command Southwest (NAVFAC SW).
- Navy. (2017). *OPNAV Instruction 5530.14E, Change 3, Navy Physical Security and Law Enforcement Program*. Washington.
- Navy. (2019). *Wetland Delineation NNPTC Facility Perimeter Fence Construction*. Charleston: Joint Base Charleston.
- NOAA. (2019, April 23). *National Oceanic and Atmospheric Administration*. Retrieved from NOAA Fisheries Essential Fish Habitat Mapper: <https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper>
- North Wind, Inc. (2016). *Final Threatened and Endangered Species Survey Joint Base Charleston Weapons Station*. Charleston.

- NRCS. (1980). *Soil Survey of Berkeley County, South Carolina*. USDA.
- NRCS. (2018a). *Hydric Soils - Introduction*. Natural Resources Conservation Service, U.S. Department of Agriculture . Retrieved June 26, 2018, from https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961.
- NRCS. (2018c). *SSURGO*. Natural Resources Conservation Service, U.S. Department of Agriculture: USDA. Retrieved June 25, 2018, from https://data.nal.usda.gov/system/files/SSURGO_Metadata_-_Table_Column_Descriptions.pdf.
- NRCS. (no date). *Updated T and K Factors Questions and Answers*. USDA.
- Office of Economic Adjustment. (2015). *Defense Spending by State Fiscal Year 2015*. Retrieved from U.S. Department of Defense Office of Economic Adjustment: <http://www.oea.gov/defense-spending-state-fiscal-year-2015>
- Poplin, E. C., Rust, T., & Bailey Jr., R. (1996). *Archaeological Survey of the Proposed Naval Nuclear Power Training Command Facility, Naval Weapons Station—Charleston, Berkeley County, South Carolina*. Atlanta: Brockington and Associates, Inc.
- SAFMC. (2019, April 23). *South Atlantic Fishery Management Council*. Retrieved from Snapper Grouper: <http://safmc.net/useful-info/snapper-grouper/>
- SCDHEC. (2019, April 18). *South Carolina Department of Health and Environmental Control*. Retrieved from The State of South Carolina's 2018 Integrated Report (IR): https://scdhec.gov/sites/default/files/media/document/PN_IR_Part_I_2018.pdf
- SCDNR. (2015a). *South Carolina's Bald Eagles— Biology*. Retrieved April 8, 2019, from <http://www.dnr.sc.gov/wildlife/baldeagle/biology.html>
- SCDNR. (2015b). *Rare, Threatened, and Endangered Species of South Carolina - by County*. Retrieved March 11, 2019, from South Carolina Department of Natural Resources: <http://www.dnr.sc.gov/species/berkeley.html>.
- SCDNR. (2015c). *SC Rare, Threatened & Endangered Species Inventory State Rank - NatureServe National and Subnational Conservation Status Rank Definitions*. Retrieved May 29, 2019, from South Carolina Department of Natural Resources: <http://www.dnr.sc.gov/species/staterank.html>.
- SCMBTF. (2017). *The Economic Impact of South Carolina's Military Community, A Statewide and Regional Analysis*. Retrieved from South Carolina Military Base Task Force: <https://www.charlestonchamber.org/>. May.
- SCPA. (2019). *Economic Impact - SC Ports Authority*. Retrieved March 12, 2019, from <http://www.scspace.com/our-impact/economic-impact/>
- U.S. Air Force. (2014). *Guide for Environmental Justice Analysis under the Environmental Impact Analysis Process (EIAP)*. Air Force Civil Engineer Center.
- U.S. Air Force. (2015). *Final Report – Integrated Natural Resources Management Plan, FY 2015 Update*. Charleston: Charleston Air Force Base.
- U.S. Air Force. (2017). *Joint Base Charleston - Weapons Spill Prevention, Control, and Countermeasures Plan Update, Change 2*. Charleston.

- U.S. Air Force. (2017). *Wildland Fire Management Plan Charleston Air Force Base and North Auxilliary Landing Field*. Charleston.
- U.S. Air Force. (2018). *Storm Water Pollution Prevention Plan Joint Base Charleston*. Charleston.
- U.S. Air Force. (2018a). *Installation Development Plan (IDP), Joint Base Charleston*. Charleston.
- U.S. Air Force. (2018b). *Integrated Cultural Resources Management Plan, Joint Base Charleston, September 2018*.
- U.S. Air Force. (2018c). *Integrated Solid Waste Managment Plan Joint Base Charleston*. Charleston.
- US Department of Agriculture, Forest Service. (2006). *Low-Water Crossings: Geomorphic, Biological, and Engineering Design Considerations*. National Technology and Development Program.
- USCB. (2017a). *American FactFinder*. Retrieved from Hispanic or Latino Origin by Race, Universe: Total Population 2013-2017 American Community Survey Five-Year Estimates: <https://factfinder.census.gov>.
- USCB. (2017b). *Race Berkeley County Block Groups*. Washington: 2013-2017 American Community Survey 5-Yr Estimates. Retrieved from <https://factfinder.census.gov>
- USCB. (2017c). *American FactFinder*. Retrieved from Poverty Status in the Past 12 Months 2013-2017 American Community Survey Five-Year Estimates: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table.
- USCB. (2017d). *Poverty Status of Individuals in the Past 12 Months by Living Arrangement*. Retrieved from 2013-2017 American Community Survey Five-Year Estimates: www.census.gov.
- USCB. (2017e). *Small Area Income and Poverty Estimates (SAIPE) Program*. Retrieved May 8, 2017, from United States Census Bureau: <https://www.census.gov/programs-surveys/saipe/guidance/model-input-data/denominators.html>.
- USCB. (2017f). *American Fact Finder*. Retrieved from ACS Demographic and Housing Estimates, 2013-2017 American Community Survey Five-Year Estimates: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP05&prodType=table.
- USCB. (2017g). *American Fact Finder*. Retrieved from Sex by Age, Universe: Total Population, 2013-2017 American Community Survey Five-Year Estimates: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B01001&prodType=table.
- USEPA. (1999). *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. USEPA.
- USEPA. (2019a). *EPA Envirofacts RCRA Info*. Retrieved March 31, 2019, from U.S. Environmental Protection Agency: https://ofmpub.epa.gov/enviro/brs_report_v2.get_data?hand_id=SC8170022620&rep_year=2017&naic_code=&naic_code_desc=&yvalue=2017&mopt=0&mmopt=&wst_search=0&keyword1=&keyword2=&keyword3=&rvalue1=&rvalue2=&rvalue3=&cvalue1=&cvalue2=&cvalue3=.
- USEPA. (2019b). *Environmental Justice*. Retrieved February 5, 2019, from U.S. Environmental Protection Agency: <https://www.epa.gov/environmentaljustice>.

- USEPA. (2019c). *2014 National Emissions Inventory (NEI) Data*. Retrieved January 30, 2019, from Air Emissions Inventories: <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>.
- USEPA. (2019d). *South Carolina Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved February 28, 2019, from Green Book: https://www3.epa.gov/airquality/greenbook/anayo_sc.html.
- USEPA. (2019e). *South Carolina Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved from Green Book: https://www3.epa.gov/airquality/greenbook/anayo_sc.html.
- USFWS. (2005). *Species Account - Wood Stork (Mycteria americana)*. Retrieved from <https://www.fws.gov/northflorida/species-accounts/wood-stork-2005.htm>.
- USFWS. (2008). *USFWS Birds of Conservation Concern*. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Arlington. Retrieved April 8, 2019, from <http://www.fws.gov/migratorybirds/>.
- USFWS. (2011). *Species Account - Red-cockaded Woodpecker (Picoides borealis)*. Retrieved March 6, 2019, from https://www.fws.gov/southwest/es/oklahoma/Documents/TE_Species/Species%20Profiles/Red%20cocked%20woodpecker.pdf.
- USFWS. (2016). *Cape Romain National Wildlife Refuge, South Carolina*. Retrieved from U.S. Fish and Wildlife Service: https://www.fws.gov/refuge/Cape_Romain/map.html. September 26.
- USFWS. (2019). *Official Species List. Federally Listed Species with Potential to Occur at Joint Base Charleston*. South Carolina Ecological Services Field Office, IPaC Letter.

This page intentionally left blank.

7 List of Preparers

This Environmental Assessment was prepared collaboratively between the U.S. Department of the Navy, U.S. Air Force, and contractor preparers.

U.S. Department of the Navy

<i>Name</i>	<i>Navy Organization/Agency</i>	<i>Role</i>
Jeffery H. Butts, J.D., AICP	NAVFAC Atlantic	Project Manager/Community Planner
Laura Wood	NAVFAC Atlantic	Project Manager/NEPA Planner (former)
Thad McDonald	NAVFAC Atlantic	Wetland Specialist
Royce Kemp	NAVFAC Southeast	Navy Region Southeast NEPA Coordinator, NAVFAC SE NEPA Compliance Section Head
Jeremy Jennings	NAVFAC Southeast	Wildlife Biologist
John Calabrese	NAVFAC Southeast	Cultural Resources Specialist
LCDR Chad Gross	Naval Nuclear Power Training Command (NNPTC)	Director, Training Support & Transitional Personnel

U.S. Air Force

<i>Name</i>	<i>Air Force Organization/Agency</i>	<i>Role</i>
Mark Epstein	Joint Base Charleston 628 CES/CENP	Environmental Engineer/Planner
David Martin	AFCEC/CZN	NEPA Specialist
Grace Keesling	AFCEC/CZN	NEPA Specialist
Terrence Larimer	USAF 628 CES/CEIE Joint Base Charleston	Natural and Cultural Resources Manager

Leidos

<i>Name</i>	<i>Role</i>	<i>Years of Experience</i>	<i>Degree(s)</i>
Peggy Farrell, PMP, QEP, CHMM	Project Manager Chapters 1 and 2, Geological Resources (Soils), Infrastructure, Public Health and Safety, and Cumulative Impacts	30+	M.S., Natural Sciences and Environmental Studies B.A., Biology and Environmental Studies
Dr. Karen Foster, RPA	Quality Assurance/Quality Control (QA/QC)	22	Ph.D., Anthropology M.A., Anthropology B.A., Anthropology
Dr. Andrew Lissner	Program Management	30+	Ph.D., Biology B.S., Biology
Brian Tutterow	Wetland Delineation	22	B.S., Biology
Sarah Rauch	Water and Biological Resources	13	B.S., Plant Biology, Environmental Science and Ecology

<i>Name</i>	<i>Role</i>	<i>Years of Experience</i>	<i>Degree(s)</i>
Tan Hoang, AICP	Land Use	11	MUP, Urban and Regional Planning B.A., Policy and Planning B.A., English
Joseph Jimenez, RPA	Cultural Resources	30	M.A., Anthropology B.A., Anthropology
Brad Boykin	Air Quality and Noise	15	M.S., Biotechnology B.S., Biomedical Science
Vincent Passaro, QEP	Hazardous Materials and Wastes	20	M.S., Environmental Science B.S., Wildlife and Fisheries Science
Pam McCarty	Environmental Justice and Protection of Children and Socioeconomics	12	M.S., Industrial and Systems Engineering M.A., Economics B.S., Business Administration and Management
Heather Gordon	Geographic Information System (GIS)	21	M.S., Geography B.A., Environmental Studies and Planning
Alina Martin	Editing and QA	19	B.S., Integrated Science and Technology
Tara Utsey	Formatting and Navy NEPA Template Compliance	25	B.A., Liberal Arts